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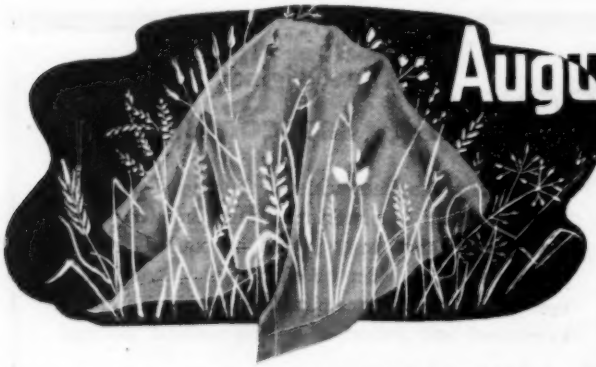

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ORIGINAL ARTICLES

MORBID RED-CELL DEVELOPMENT AND THE TREATMENT OF ANÆMIA

M. C. G. ISRAËLS, M.D., M.SC. MANC., M.R.C.P.
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"The scientific journey has no end. It has only halting places—points at which the traveller can look round and survey."—SHERRINGTON.

IN the last ten years there has been much progress in hæmatology and much re-appraisal of former ideas so that a survey now seems timely. A useful sample of the views of a decade ago is provided by Witts's Goulstonian lectures to the Royal College of Physicians in 1932.[30] Witts represented red blood-cell development as a series of successive stages represented by the scheme:

1 2 3
Reticulo-endothelial cell → megaloblast → normoblast → erythrocyte.

An important group of anæmias was shown to be due to defective development of erythrocytes, and the pathology of this group was simply conceived of as a failure of maturation at the various stages: failure of stage 1 caused aplastic anæmia, failure of stage 2 produced pernicious anæmia; when stage 3 failed anæmia typified by the microcytic iron-deficiency anæmias occurred. Anæmia of increasing severity might start with stage 3 defective and later involve stage 2 or even 1—a species of "shift to the left." Therapy was equally simply indicated, so it is not surprising that this pathological scheme was widely utilised and is, in fact, still reproduced in most English textbooks.

A considerable volume of clinical and pathological work, especially that correlated with studies of bone-marrow obtained by sternal biopsy, has now shown that this simple scheme is inadequate, and it is interesting that this further work had tended to confirm the observations of earlier workers on the development of the erythrocyte, observations that were passed over by Doan and co-workers,[4] on whose results Witts based his ideas. The more complex developmental schemes now put forward [2 13 23] are a return towards those of hæmatological pioneers like Naegeli and Ferrata. This return has brought with it a recrudescence of the confusion in cell nomenclature which was the bane of the days of the "peripheral hæmatologists," and this in itself has tended to obscure the value of these advances and prevent their adequate application by clinical workers. In spite of differences in nomenclature, a scheme of red blood-cell development similar in outline to that given below is at present accepted by a majority of hæmatologists.

Technical methods are important in hæmatology since different methods produce different microscopical appearances. There are two groups of methods—the normal histological technique of wet fixation and preparation of smears or sections, and the dry-smear method exemplified by the usual way of preparing blood-films. The pros and cons of the methods were thoroughly discussed by Downey,[5] and briefly it may be said that sections are necessary for comparing changes in the arrangement of the marrow cells, whereas dry smears are best for showing cellular detail and differentiating between the various cell types. The cell types mentioned here in the description of blood-cell development have been defined by the study of dry-smear preparations of blood, or bone-marrow obtained by sternal puncture (see Israëls).[12]

NORMAL AND ABNORMAL RED-CELL DEVELOPMENT

In the adult, red blood-cells are formed only in the bone-marrow. The most primitive cell formed there that concerns us now is the *hæmocytoblast*, so-called because it is found in hyperplasia of all blood-cell types.[13 27] It is a large cell with a rim of deeply basophilic cytoplasm and a large purple-staining nucleus of rather indefinite pattern and containing nucleoli. Its subsequent development is shown in the figure; maturation involves changes in the nuclear pattern leading eventually to shrinkage and fragmentation, and in the cytoplasm where the development of hæmoglobin causes a change in the staining reaction from basophilic to eosinophilic. Normally these changes in nucleus and cytoplasm progress in a parallel manner, but in pathological states the correlation is disturbed.

From the hæmocytoblast a *pro-erythroblast* develops, differing in being somewhat smaller and having a well-defined network nuclear pattern—nucleoli are present. Ordinarily the pro-erythroblast gives rise to a series of *normoblasts*. In the early normoblasts the nuclear pattern is coarser, from coalescence of the network pattern, and nucleoli have disappeared; the cytoplasm is still deeply basophilic. The intermediate normoblasts show progressive shrinkage of the nucleus to a cart-wheel pattern and the cytoplasm varies from moderate basophilia to purplish polychromatic staining. The late normoblast has a featureless nucleus and the cytoplasm becomes completely eosinophilic. Finally the nucleus is lost and the erythrocyte appears. When prolonged normal hyperplasia of the hæmopoietic marrow has occurred, hæmoglobin may appear in the cytoplasm at an earlier stage and normoblasts with well-patterned nuclei are found with polychromatic or even eosinophilic cytoplasm[13]; the late normoblasts and the erythrocytes developing from these prematurely hæmoglobinised cells tend to be somewhat larger than usual.

In pernicious and allied anæmias an entirely different set of cells appears in the marrow—the *megaloblasts*. The early megaloblasts resemble the pro-erythroblasts in size and staining properties, but the nucleus shows a more open network pattern and there is no coalescence of the chromatin as seen in the early normoblasts; nucleoli are absent. As maturation proceeds the chromatin strands become finer and more separate so that the intermediate megaloblast has a highly characteristic open network nucleus; hæmoglobin appears early, and these cells are usually polychromatic and may be fully eosinophilic; the cells are large compared with the corresponding normoblasts. In the late stage the nucleus collapses and is commonly eccentrically placed in a large eosinophilic cell, some traces of nuclear pattern may remain; finally the developed erythrocyte is a relatively large cell. There is much more variation in cell-size and in correlation of nuclear pattern and hæmoglobinisation of the cytoplasm among megaloblasts than among normoblasts. Mitotic figures are found in both series up to and including the intermediate stage.

The descriptions given here apply to typical cells, but since continuous change occurs along the lines of development indicated by arrows in the diagram, cells intermediate between the typical stages are always to be found.

The theory that the appearance of the megaloblasts represents a return to embryonic blood-formation was advanced by Ferrata[7] and Naegeli.[15] In the early embryo hæmocytoblasts are present in the walls of the blood islands of the yolk-sac and from them the first erythroblasts are formed—they are often called "primitive megaloblasts." At about the sixth week of development, hæmocytoblasts appear in the liver and give rise to a second generation of erythroblasts different from the megaloblasts—these are the permanent or "definitivo" generation and are called normoblasts so long as they have nuclei (Downey).[6] Later normoblast formation begins in the bone-marrow and after the 23rd week liver hæmopoiesis gradually fades out.[9] It is suggested that the megaloblasts of pernicious anæmia are identical with the primitive megaloblasts of the embryo,[6 7 17 19 27] and it is certainly a striking coincidence that when the hæmopoietic liver factor fails, blood-cells should appear that resemble those which serve the organism in its pre-hepatic stage of development. This idea, though attractive, is not yet firmly established and some workers, notably Maximow,[16] regard the megaloblasts of pernicious anæmia as purely pathological cells.

This description of the scheme of normal and pathological red blood-cell development has been given first since it defines the names used for the various cells (the term *erythroblast* is used generically for all the nucleated red-cell precursors). The evidence on which the scheme is based may now be considered.

FOUR TYPES OF PATHOLOGICAL ERYTHROPOIESIS

In untreated pernicious anæmia the marrow shows megaloblastic hyperplasia—that is to say, all types of

megaloblasts are present together with the more primitive pro-erythroblasts and some hæmocytoblasts; normoblasts are few and only of intermediate or late types; every stage of transition from hæmocytoblast to late megaloblast can often be seen, and the megaloblasts show characteristically variable hæmoglobinisation. When the specific liver factor is given in proper doses a remarkable change comes over the marrow, sometimes within 24 hours.[23] Early normoblasts appear in increasing numbers and then intermediate normoblasts, many showing early hæmoglobinisation; the megaloblasts decrease in number. About the time of the reticulocyte peak in the blood, the marrow picture shows a complete reversal. There is now a normoblastic marrow with only a few intermediate and late megaloblasts remaining; pro-erythroblasts and some hæmocytoblasts are still present and show mitosis. As recovery proceeds this normoblastic hyperplasia dies away in its turn and the marrow returns towards a normal picture.[3 13 20 25 26] These findings suggest that the liver-principle is necessary for the maturation of normoblasts from the pro-erythroblast. When the liver-principle is deficient megaloblasts appear in an attempt to make up for the lost normoblasts.

Megaloblastic hyperplasia of the marrow may also occur when, because of dietary deficiency, liver-principle cannot be produced [9 28]; or when proper absorption from the alimentary tract is interfered with, as in sprue [21 29] or after gastro-intestinal operations.[1] Normoblastic marrow can be restored with liver treatment.

Hence megaloblastic marrow is an indication—the only certain indication—for liver treatment. But the expected result does not always emerge; for there is a group of cases which are refractory to treatment, sometimes temporarily, sometimes permanently. This group has been named achrestic anæmia by Israëls and Wilkinson [14 16] who suggested that these patients were unable to utilise the liver-principle known to be present in adequate amounts. Megaloblasts have not been certainly identified in any other types of anæmia (except the very rare acute erythræmia).[9 11] The erythroblasts appearing in all other primary and secondary anæmias are always normoblasts and pro-erythroblasts.

Iron-deficiency anæmia is an example of failure of maturation of the normoblasts. Bodley Scott [24] recently pointed out that though the marrow is hyperplastic the intermediate normoblasts are small, distorted and poorly hæmoglobinated, and give rise to the characteristic microcytes. Sufficiently energetic iron therapy restores normal erythropoiesis. When peripheral loss of erythrocytes is prolonged and severe, as in hæmolytic anæmias, there is again an intense normoblastic hyperplasia in the marrow, but this time they are larger than usual, their nuclei are well-patterned and there is often sufficient hæmoglobin in their cytoplasm to cause advanced polychromatic or even eosinophilic staining; pro-erythroblasts and even hæmocytoblasts are usually present.[13 19] There is no evidence of liver-principle deficiency in this group. The treatment is that of the primary condition causing the loss of blood-cells plus administration of iron to provide for the exceptionally active erythropoiesis. Here again there occurs a group of refractory patients with normoblastic marrow, in whom no evidence of undue peripheral blood loss can be found, who do not respond to ordinary treatment, and who, if supported by blood-transfusions, may eventually recover; such cases have been called "pseudo-aplastic." [15 22]

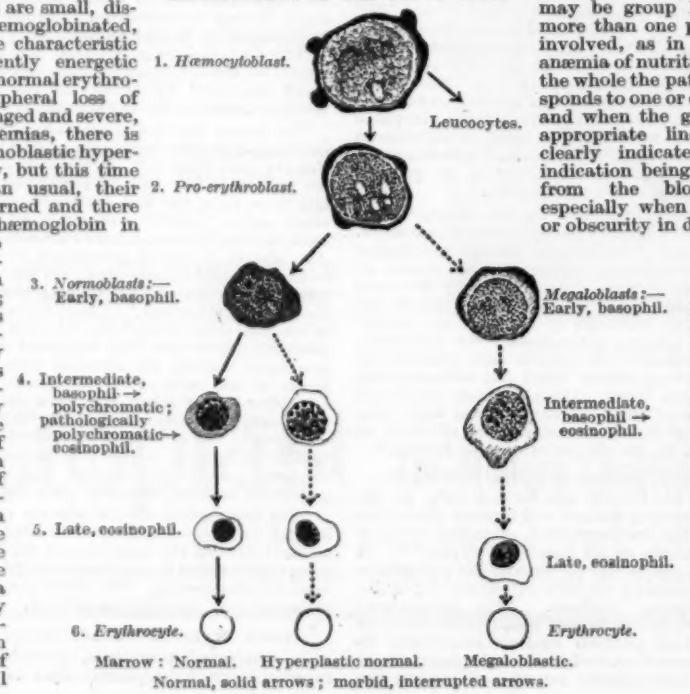
Thus hyperplasia of the erythropoietic tissue may be megaloblastic or normoblastic, the primitive pro-erythroblasts being present in both. The former occurs only when the hæmopoietic liver-principle is absent or its action is disturbed; all others fall into the latter class. "Shift to the left," caused for instance by prolonged blood loss, leads to the appearance of increased numbers of primitive normoblasts and pro-erythroblasts. It never leads to the appearance of megaloblasts, and there is no convincing evidence that megaloblasts and normoblasts are interchangeable.

Finally there are the conditions in which the erythropoietic marrow is hypoplastic or completely aplastic. Such red blood-cell development as remains proceeds along the normoblastic line, and there are all grades of hypoplasia shading down to complete aplasia.[10 24] There may be patches of hyperplasia which will be misleading if punctured at sternal biopsy, but in progressing cases diminution of erythropoieses is always seen after an interval. This group includes primary aplastic anæmia and secondary anæmias caused by the depressing action of drugs or toxins on erythropoiesis. The primary aplasias can only be treated by blood-transfusion; the secondary group are treated according to the cause, and transfusions to tide over difficult periods together with iron when erythropoiesis recovers is a rational plan of treatment.

Experience has shown that there are four main types of pathological erythropoiesis: (1) hyperplastic but with failure of normal maturation of pro-erythroblasts; (2) hyperplastic with failure of maturation of normoblasts; (3) hyperplastic erythropoiesis with normal maturation; and (4) general failure of erythropoiesis. The clinical syndromes corresponding to these pathological types are given in the Table on the opposite page.

Into a scheme such as this the majority of cases of anæmia will be found to fit. Some diseases provoke erythropoietic changes in more than one category. Thus the anæmia accompanying splenic anæmia, cirrhosis of the liver or leukæmia may in one patient be of group 3, in another group 4; the anæmia following gastric resection may be group 1 or 2. Sometimes more than one pathological group is involved, as in some patients with anæmia of nutritional origin. But on the whole the pathological type corresponds to one or other of these groups, and when the group is decided the appropriate line of treatment is clearly indicated, a more certain indication being thus obtained than from the blood-picture alone, especially when there is any doubt or obscurity in diagnosis.

DEVELOPMENT OF RED BLOOD-CELLS



SUMMARY

A scheme of normal and pathological erythropoiesis is proposed, which shows that disease may cause changes in the development of the normoblastic group of cells, or maturation may be deflected to a megaloblastic group—regarded by some as a return to the first type of embryonic blood-cell development.

Four main groups of pathological erythropoiesis are distinguished:—

1. Failure of maturation of pro-erythro-

MORBID ERYTHROPOIESIS

BONE-MARROW TYPE	CLINICAL TYPES
1. *Failure of normal maturation of pro-erythroblasts:* suppression of normoblasts; deflection of maturation to megaloblasts.	(*a*) Pernicious anæmia, due to deficiency of liver-principle. (*b*) Achrestic anæmia, refractory to treatment, due to non-utilisation of liver-principle. (*c*) Anæmia due to dietary deficiency or failure of absorption of liver-principle.
2. *Failure of maturation of normoblasts:* hyperplastic but deformed normoblasts and inadequately hæmoglobinated microcytes.	Iron-deficiency anæmias.
3. *Hyperplastic normal maturation:* increased normoblasts and pro-erythroblasts; often unusually early hæmoglobin formation in normoblasts.	(*a*) Anæmias due to prolonged peripheral blood loss by chronic hæmorrhage, intravascular lysis (hæmolytic anæmia) purpura, malignancy; cirrhosis of liver, leukæmia, &c. (*b*) Anæmias of unknown ætiology refractory to treatment; "pseudo-aplastic."
4. *General failure of erythropoiesis:* diminished or completely absent erythroblasts; when present, all normoblasts.	Aplastic anæmias of primary type and those secondary to action of drugs or toxins; secondary hypoplasia in leukæmia or splenic anæmia.

Blood-picture: Group 1 always megalocytic with colour-index over 1. Group 2 always microcytic with colour-index under 1. Groups 3 and 4 usually normocytic; colour-index about 1, but may be over 1 and there may be megalocytosis in some cases, especially in group 3.

Treatment: Liver, or desiccated stomach, treatment is only appropriate in group 1; iron therapy is specific in group 2; in groups 3 and 4 treatment of the anæmia takes second place to action against the cause of the anæmia, if known; blood-transfusions and iron treatment are indicated.

blasts with suppression of normoblast development and hyperplasia of megaloblasts;

2. Failure of maturation of normoblasts with hyperplastic but distorted development of normoblasts leading to the formation of inadequately hæmoglobinised microcytes;

3. Hyperplastic normal maturation, which if sufficiently severe and prolonged leads to the appearance of many early erythroblasts and unusually early hæmoglobin formation in the normoblasts;

4. General failure or erythropoiesis, of varying degree.

Clinical conditions corresponding to these groups are given. Group 1 comprises pernicious and allied anæmias due to deficiency or disturbed action of the hæmopoietic liver-principle; group 2 corresponds to the iron-deficiency anæmias; group 3 changes are found in a variety of anæmias characterised by vigorous erythropoietic response to loss of red blood-cells—liver-deficiency plays no part here; group 4 comprises the idiopathic and secondary aplastic anæmias. Attention is drawn to the refractory cases occurring in groups 1 and 3.

Treatment of an anæmia varies according to the pathological group into which it falls. Specific liver or desiccated stomach treatment is only appropriate in group 1.

I am indebted to Dr. John F. Wilkinson and other members of the honorary staff of the Manchester Royal Infirmary for allowing me access to their patients. Part of this work was carried out while holding a Foulerton research fellowship of the Royal Society.

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MOTOR NEURONE DEGENERATION TREATED WITH VITAMIN E

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MEDICAL REGISTRAR TO THE HOSPITAL

THIS clinical investigation was undertaken to ascertain the possible value of vitamin E in the treatment of motor neurone degeneration (progressive muscular atrophy, amyotrophic lateral sclerosis and progressive bulbar paralysis). A series of 25 cases of different forms of the disease have been treated for periods ranging from 5 to 10 months with vitamin E (α-tocopherol acetate) in doses of either 18 mg. or 30 mg. daily, and the results have been assessed.

The assumption that vitamin E is of therapeutic value in motor neurone degeneration rests on the following experimental and clinical evidence.

EXPERIMENTAL EVIDENCE

Evans and Burr (1928) first noted the occurrence of a nutritional muscular dystrophy in young rats deprived of vitamin E in their diet, and whose mother had been given only just enough of the vitamin to produce a litter. The onset of the muscular paresis was sudden on or about the twentieth day of life; if the animal survived the paralysis appeared to be self-limiting. Pathological examinations showed severe degeneration of the skeletal muscles but the central nervous system was unaffected; the terminal portions of the peripheral nerves and the end-plates were found to be intact in the midst of necrotic muscle cells. The muscular dystrophy could be prevented if wheat-germ oil or vitamin-E concentrates were administered to either mother or young during the period of lactation. Similar muscular lesions have been produced in ducklings, guineapigs and rabbits reared under comparable conditions.

Older rats observed by Einarson and Ringsted (1938) showed changes in the central nervous system in addition to those in the skeletal muscles. In the earliest phase of the disorder they describe characteristic lesions in the posterior spinal nerve-roots and posterior columns of the spinal cord. These are later succeeded by degeneration of the anterior horn cells and anterior spinal nerve-roots. The third phase, which is inconstant, is distinguished by involvement of the pyramidal tracts. Einarson and Ringsted consider the pathological findings as representing a process resembling a combination of tabes dorsalis and amyotrophic lateral sclerosis. The muscular changes, they state, although ultimately resembling those of a muscular atrophy of spinal origin, in the earlier stages approximate more closely to a muscular dystrophy. They suggest the possibility of a true mixed phenomenon—a combination of muscular dystrophy and amyotrophic lateral sclerosis.

While vitamin E is capable of preventing the disease if given sufficiently early, and in some animals is of curative value, in others the prolonged and concentrated administration of the vitamin has failed to influence the established condition. This does not necessarily disprove that the essential ætiological factor is a vitamin-E deficiency. Goettsch and Pappenheimer (1931) and Morgulis and Spencer (1936), however, claim that the nutritional muscular dystrophy cannot be considered

DR. ISRAËLS: REFERENCES (*continued*)

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as solely dependent on the absence of vitamin E; they think the disorder should be regarded rather as a multiple deficiency disease. This view has been challenged by Mackenzie, Levine and McCollum (1940), who state that they have been able to cure the muscular dystrophy of rabbits raised on identical vitamin-deficient diets by the administration of vitamin E (α-tocopherol) alone.

It is well known that in the absence of vitamins other than vitamin E in a diet, paralytic syndromes are liable to arise, but these syndromes can be distinguished from the form of vitamin-E deficiency under discussion. Thus while the animals deprived of vitamin E were normal in every respect apart from the muscular and nervous lesions, the paralysis consequent on the absence of vitamin B or C from the diet is only part of a profound constitutional change with emaciation, invariably ending fatally.

The spontaneous arrest of the muscular dystrophy in young rats deprived of vitamin E has been mentioned; Aberle (1934) found that rats reared on a diet deficient in vitamin A showed—in addition to a disabling paralysis—profound loss of weight and xerophthalmia. Finally, Evans and Burr were unable to influence the incidence of the muscular dystrophy in young rats by the administration of vitamins A, B, C and D; but vitamin E was found to be effective.

The neuromuscular disorder resulting from vitamin-E deficiency in animals seems to vary according to the particular class of animal and to some extent with the period of life at which the deprivation occurs. Pappenheimer (1940) has recently reviewed the various forms of disorder hitherto described. For instance, while the adult hen manifests no abnormality when deprived of vitamin E, newborn chicks develop an encephalomalacia, the essential pathological lesion being an ischæmic necrosis. An entirely different response is observed in the turkey, in which the central nervous system and skeletal muscles escape but the smooth muscle of the gizzard undergoes a patchy hyaline necrosis.

Experimental evidence thus indicates that animals, as a result of vitamin-E deficiency, may develop a muscular dystrophy and degenerative changes in the central nervous system. Further, that the nature and extent of the degenerative lesions vary with the class and age of the animal.

CLINICAL EVIDENCE

Bicknell (1940) treated several cases of muscular dystrophy with fresh dried whole wheat-germ oil, ½ oz. twice daily. In addition, he placed 4 cases of amyotrophic lateral sclerosis on similar treatment; 2 of these patients died, but some clinical improvement was noted in the 2 remaining. He suggests that a large supply of vitamin E may be of value in all degenerative conditions of the muscular or nervous systems. Demole (1940) supports Bicknell's assertion. Wechsler (1940) records 2 cases of amyotrophic lateral sclerosis which were seen to improve when given synthetic α-tocopherol 3 mg. thrice daily. In a subsequent communication (1940) he claims improvement of varying degrees in 11 of 20 cases of amyotrophic lateral sclerosis. The treatment consisted in a daily dose of 30 mg. α-tocopherol acetate (later increased to 50 mg.), a diet rich in vitamin E, bile-salts to increase the absorption of the fat-soluble vitamin, and the whole vitamin-B complex. In addition, every patient received 2 teaspoonfuls of whole wheat-germ oil daily, and in about half the cases 50 mg. of tocopherol in oil was injected intramuscularly each day.

Shelden (1940) obtained negative results in 18 patients, 10 of whom were suffering from amyotrophic lateral sclerosis and 8 from muscular dystrophy, but hopes that future research may reveal some combination of this vitamin with other essential nutrient materials which may prove more efficacious. A family is reported by Donovan (1940) in which the father and daughter had lordosis and the son muscular dystrophy. Whole wheat-germ oil was prescribed, and all 3 cases showed improvement in their general health and felt more energetic. Stone (1940) noted improvement in muscular strength and texture in 7 patients—5 with muscular dystrophy, 1 with muscular wasting as a sequel of multiple neuritis and 1 with muscular atrophy following poliomyelitis—as the result of treatment with wheat-germ oil, 1 capsule thrice daily. Spies and Vilter (1940) were impressed by the striking general improvement in chronically ill-nourished people treated with α-tocopherol. Taylor (1940) points out that in Lahore the incidence of muscular dystrophies, tabes dorsalis and amyotrophic lateral sclerosis is about the same as that in any London general hospital. He found the diets of such cases to contain adequate amounts of vitamin E, and he therefore doubts the validity of the theory that vitamin-E deficiency is the cause of certain neuromuscular disorders.

Denker and Scheinman (1941) treated 11 cases of amyotrophic lateral sclerosis with α-tocopherol, administered orally, parenterally or by both routes. Each patient received a total dosage of 100 mg. each day, but no therapeutic results of any value were noted. From their observations on 6 cases treated for periods varying from 6 to 12 months, Ferrabie, Klingman and Frantz (1941) concluded that vitamin E and vitamin B_6 preparations, even when given in large amounts, failed to influence the course of either amyotrophic lateral sclerosis or muscular dystrophy.

PRESENT INVESTIGATION

The 25 cases in this series are grouped under three headings according to the part of the neuromuscular system most affected by the degeneration, as bulbar paralysis, progressive muscular atrophy and amyotrophic lateral sclerosis. The last term is sometimes used to include all manifestations of motor neurone degeneration, but it will be restricted here to cases in which a lesion of the pyramidal tracts is the predominant clinical feature. Occasionally it is difficult to distinguish between the pure spastic paraplegia of amyotrophic lateral sclerosis, with no definite muscular wasting, and certain cases of disseminated sclerosis, especially those in which paraplegia is not associated with signs of incoördination, bladder disturbances or remission. The diagnosis in some such cases must remain a matter of personal opinion. In this study, a diagnosis of motor neurone degeneration has been accepted in cases of upper neurone paraplegia in which the onset has been after middle age; the deterioration has been steady and relentless, and there have been no symptoms, signs or history to suggest disseminated sclerosis.

Owing to restriction in space, it has not been possible to include details of all cases; only 5 special examples have been selected. All systems other than the neuromuscular system showed no abnormalities; the cerebrospinal fluid was examined in every case and was normal; the blood Wassermann reaction was negative in all cases. Muscular fibrillation was noted in every case where evidence of involvement of the anterior horn cells existed, and will therefore be referred to only in the exceptional cases.

BULBAR PARALYSIS

The 9 cases of bulbar paralysis treated included 6 men and 3 women, their ages ranging from 50 to 64. All showed the usual symptoms of dysarthria and dysphagia with glossolabial paresis, and most of them had different degrees of spinal motor neurone degeneration showing itself by atrophy of the intrinsic muscles of the hands, fibrillation in some muscle groups or an early paraplegia with extensor plantar reflexes. In 8 cases 30 mg. of α-tocopherol acetate was given daily for 6–9 months; the ninth case received wheat-germ oil equivalent to 18 mg. of tocopherol daily for 10 months. While still under treatment 3 of the patients died, but each had taken vitamin E for more than 8 months. The remaining 6 patients showed a steady increase in the degree of bulbar paralysis even during treatment; only 1 case showed some improvement in his sense of well-being, in spite of retrogression in the neurological condition.

PROGRESSIVE MUSCULAR ATROPHY

In 9 cases the predominant clinical features were muscular weakness and atrophy with fibrillation; 4 had evidence of additional upper motor neurone changes in the lateral columns. There were 6 men and 2 women, aged from 42 to 59, and 1 woman who showed pronounced muscular atrophy, especially of the intrinsic muscles of both hands, and a mild upper neurone paraplegia at the unusually early age of 25. In all cases except the one described below, treatment with tocopherol was continued

for 6–9 months. Evidence of an advance in the disease was seen in 5 cases examined after this period of treatment, and 1 case showed no change in symptoms or physical signs. In 2 cases there appeared to be some improvement in gait with a raised level of general health, and 1 patient remained more or less stationary but with a more cheerful outlook. Details of the last 3 cases are as follows:—

CASE 1.—A woman, aged 42, presented the extraordinary combination of: Cushing's syndrome (pituitary basophil adenoma), and motor neurone degeneration, which had made its appearance at the remarkably early age of 11. Examination in April, 1940, showed weakness and atrophy of the small muscles of the hands and a spastic paresis of the lower limbs with bilateral extensor plantar reflexes. Wheat-germ oil capsules, 1 t.d.s., were prescribed (equivalent to 18 mg. tocopherol daily); after 2 months, tocopherol acetate, 30 mg. daily, was given instead. While in hospital the patient was depressed and irritable, and indeed, before her admission she had been under observation for her mental condition. After 4 months' vitamin-E therapy no change in the physical findings was noted, although her gait had slightly improved. Her mental state had responded very satisfactorily; she was now much happier and her periodic emotional outbursts were less frequent and less violent.

CASE 2.—A man, aged 59, seen in May, 1940, when the condition had been present for 8 months. He had gross wasting of the small muscles of the hands and of the forearms, both pectoralis major muscles and less severe wasting of the leg muscles. He was given α-tocopherol acetate, 30 mg. daily, until December, 1940. At the end of this period there had been no advance in the loss of muscle substance but possibly some increase in the weakness. The patient said he had greatly improved in spirits and general health. In March, 1941, he wrote from Dorset to say that he continued in good health and seemed to be walking better.

CASE 3.—A man, aged 69. In July, 1940, 8 months after the onset of illness, clinical examination showed weakness and wasting of the muscles of the shoulder girdle and the hypothenar eminences, and loss of power in the legs with fibrillation but no muscular atrophy. Administration of α-tocopherol acetate, 30 mg. daily, was begun in July and continued until the middle of December, 1940. There was no change in the disease, but a great improvement in his general health and he was now more cheerful.

AMYOTROPHIC LATERAL SCLEROSIS

Paraplegia of upper neurone type was the predominant clinical manifestation in 7 of the cases treated; 6 were men and 1 a woman, aged from 45 to 52. After 6–9 months' treatment, 5 cases showed evidence that the disease was steadily advancing; 1, in spite of some advance in muscular atrophy, showed a striking amelioration in general health and mental outlook. In the remaining 2, details of which are given below, the clinical condition had definitely improved.

CASE 4.—A man, aged 45, in whom the disease began in April, 1940. In May, 1940, he had slight wasting and weakness of the interossei and lumbrical muscles, with spastic paraplegia; both plantar reflexes were extensor and the abdominal reflexes were absent. Treatment with α-tocopherol acetate, 30 mg. daily, was continued until December, 1940, when there was some improvement in power of the lower limbs and in walking, while the early wasting of the hand muscles was less evident. His general health had also improved and he was more cheerful.

CASE 5.—A man, aged 50, who first experienced weakness of the lower limbs 18 months before beginning vitamin-E therapy in June, 1940. Examination showed a spastic paraplegia but no muscular wasting in any part of the body. He could walk only with assistance. After 6 months' treatment with α-tocopherol acetate, 30 mg. daily, he could walk the length of the ward several times by himself with a stick, but there was no change in the physical signs of a bilateral pyramidal lesion. At first sight this patient's neurological condition seems to have been benefited by vitamin-E therapy, but such a conclusion cannot be accepted unreservedly. For the 18 months before his admission he had been confined to bed and had become depressed and despondent. The interest and encouragement shown him in hospital stimulated his desire and his efforts to improve, and the undoubted improvement in his mental outlook had a similar effect.

DISCUSSION

Vitamin E was administered to the patients in two forms—as wheat-germ oil and α-tocopherol acetate. In 1936, Evans, Emerson and Emerson succeeded in isolating from wheat-germ oil two alcohols both of which possessed the biological properties of vitamin E and to which they gave the names of α- and β-tocopherol respectively; α-tocopherol has since been synthesised and has been proved to be as active (by the fertility test in animals) as the vitamin obtained from natural sources. The acetate of α-tocopherol is a very stable form. Each capsule of the wheat-germ oil we used is stated to have a standardised tocopherol content of 6 mg. In addition to vitamin E, wheat-germ oil contains other active factors, such as vitamin B_1. Antopol and Schotland (1940) report beneficial effects from the use of vitamin B_1 in cases of muscular dystrophy. In consequence, reports of the value of wheat-germ oil in neuromuscular disorders must be accepted with reserve as evidence of the efficacy of vitamin E, since other principles may participate or even be entirely responsible for the alleged improvement.

The cause of motor neurone degeneration still remains obscure. Various hypotheses have been presented but none is wholly acceptable. No definite evidence exists in support of an infective agent or toxin. The view has been advanced that the disease is of the nature of an abiotrophy, but Wilson (1940) considered such a theory untenable in view of the distribution of the lesions. He pointed out that the degenerative changes are not confined to the motor system nor are they clearly systematised, the process being diffuse in many zones. On the results of the experimental work on animals, some grounds exist for the postulation of vitamin-E deficiency as part of the underlying ætiology. Vitamin E is very stable to heat, light and desiccation, but—as Bicknell argues—it is readily decomposed in the presence of salts and fats, especially when the fats become rancid. It has never been conclusively demonstrated, however, what minimum quantities of this vitamin are essential in the human body, nor that a deficiency produces untoward effects. The difficulties in estimating the content of vitamin E in the blood, and the scanty investigations in normal subjects, account for the lack of detailed evidence. Vitamins may possibly act as therapeutic agents, irrespective of whether or not there is a deficiency in the body, so that our inability to prove a vitamin-E deficiency in motor neurone degeneration does not rule out the possible value of the vitamin in treatment.

The prognosis of motor neurone degeneration is always grave, although the rate of progress varies. Death may occur in a few months, or only after many years. Periods during which no advance of the disease takes place are by no means uncommon; so that in those of our cases in which the condition has become stationary it cannot be claimed that vitamin E necessarily produced this effect. Clinical methods were relied on in the observations of the course of the malady. An attempt was made to aid assessment of progress by estimating the urinary creatine and creatinine but this proved unsuccessful, partly because we were unable to control the patients' diets and partly on account of the difficulty in estimating urinary outputs.

The general result of vitamin-E treatment has been disappointing, only 3 of the 25 cases showing some improvement. In one of these (case 5) psychologic factors influencing the result have already been discussed; and it is doubtful whether the response could be attributed entirely to the vitamin E. Case 4 improved both as regards spastic paraplegia and muscular atrophy, and it seems reasonable to assume that the favourable response in this case was dependent on the vitamin-E therapy. In case 2 we had to rely on the patient's report of his improvement, since distance from London precluded clinical examination. All 3 of these cases had been treated with 30 mg. of α-tocopherol acetate daily for 6–9 months; 2 other cases in the series remained more or less stationary over periods of 5 and 6 months respectively, and another (case 1) showed slight improvement in gait but no change in physical signs after 5 months' treatment. It is noteworthy that all 9 cases of bulbar paralysis became definitely worse.

An unexpected feature of the investigation was the pronounced effect on the general vitality and emotional tone in 9 of the 25 patients, who said they felt better and were happier and more contented. To a large extent the despairing and depressed outlook, engendered by the gravity of their malady, was mitigated, while in 2 cases an actual tendency to euphoria was observed. In view of the deterioration in the neuromuscular disorder and consequent increasing incapacity noted in some of these patients, this result was the more surprising. It might partly be attributed to the institution of a definite line of treatment in a malady regarded as incurable, but it is also possible that vitamin E may act as a stimulant to general health and give rise to a feeling of well-being in states of depression. Judging by our series the body-weight is unaffected by the vitamin.

The published reports on the clinical aspects of vitamin-E therapy are as yet so few that Bicknell's statement "that vitamin E appears indeed to be one of the great advances in general medicine of the century" is at least premature; nor has it been justified by the results hitherto recorded. From a practical standpoint it seems that vitamin-E therapy is in too early a stage for any definite conclusions to be drawn, and its value in neuromuscular disorders remains speculative.

SUMMARY

The experimental and clinical evidence in favour of the application of vitamin-E therapy to neuromuscular disorders, and especially to motor neurone degeneration, is reviewed.

A series of 25 cases of motor neurone degeneration is recorded, including bulbar paralysis, progressive muscular atrophy and amyotrophic lateral sclerosis, in which vitamin-E therapy was applied for periods of 5 to 10 months.

Vitamin E was given in the form of synthetic α-tocopherol acetate (30 mg. daily) or wheat-germ oil capsules equivalent to 18 mg. tocopherol daily.

Of the 25 cases, only 2 showed definite improvement; a third case reported his condition as improved, and slight improvement in gait was noted in a fourth.

Progressive deterioration occurred in all 9 cases of bulbar paralysis.

Improved general health and emotional tone were noted in 9 patients.

The value of vitamin-E therapy in motor neurone degeneration remains speculative, but in view of the improvement in 2 of our cases it is worthy of further trial.

We wish to thank Dr. Frederick Prescott for his help in the investigation, Dr. Colin Edwards for the notes of two cases, and Messrs. Roche Products for supplies of α-tocopherol acetate.

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According to the *New York Times* Dr. Alexis Carrel, who is now in France, is to organise an institute for scientific and medical research in the occupied zone.

MODIFIED INSULIN THERAPY IN WAR NEUROSES

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PREVIOUS communications from this unit [1] have emphasised that loss of weight and other physical changes have figured prominently in many cases of war neurosis admitted here, especially where there has been severe or protracted stress. These changes may occur insidiously; and even where they are considerable the patient often does not look particularly thin or ill on admission. Careful inquiry, or the patient's photograph before illness, may be necessary to show the extent of the physical alteration. Once lost, weight is not easily regained; but it is open to doubt whether a stable psychological recovery can be obtained without restoration of normal physique.

Many years ago Weir Mitchell urged the importance of restoration of physique in the treatment of neurotic illness. By means of an enormous diet, supplemented by rest and heavy massage to promote sweating and appetite, he bolstered up the neurotic's physical constitution and thereby obtained some remarkable psychological improvements. More recently his results were interpreted as being largely due to suggestion, and the essentials of his treatment held of little value. This paper reports the results of two modified forms of insulin therapy, the second probably somewhat similar in its effects to the original Weir Mitchell treatment. A considerable physical improvement may be obtained, together with amelioration of acute neurotic symptoms. But the evidence is against the suggestion that by this means long-standing neurotic tendencies, innate in the personality, are in any way altered. There is nothing new in the essentials of this treatment, for many workers have noticed its occasional benefit in psychiatric conditions other than schizophrenia, but such a large series of cases has not previously been reported.

TECHNIQUE

For its application to different material, the technique was modified in two stages from that generally used in the treatment of schizophrenia. At first, a group of patients with reactive and endogenous depression or anxiety states, who showed loss of weight, were given increasing doses of insulin until light coma supervened. The insulin was given intramuscularly at 7 A.M., when the patient was fasting, and light coma followed in the third hour afterwards. It was interrupted by the nasal administration of 7 oz. sugar in tea as soon as it was deep enough for the nasal tube to be passed unnoticed by the patient. Interruption by intravenous glucose was also used for convenience, or when hypoglycæmic excitement needed controlling. Only a small number of patients could be treated at one time in this way; and though the method eliminated the dangers of prolonged and deep coma it required skilled nursing and constant supervision. Large doses of insulin (20–300 units) had to be used; and special precautions, by securing an adequate diet during the rest of the day, were required to prevent the occurrence of after-shocks. Table I shows the results obtained in the treatment of 18 cases by this method.

As it became necessary to conserve both sugar and insulin, a simpler technique was adopted, which has the considerable advantage that a much larger number of patients can be treated at the same time. A smaller dose of insulin (20–100 units) is given fasting at 7 A.M., just insufficient to produce a light coma or hypoglycæmic excitement. The interruption, at 10 A.M., is by giving a cup of tea containing 2 oz. of sugar, the rest of the carbohydrate being made up with 12 oz. or more of potatoes.* The aim is to produce a state of drowsiness for as long as possible between injection and interruption. Nasal interruption is no longer necessary. If the patient shows

1. Sargant, W. and Slater, E. *Lancet*, 1940, **2**, 1; Slater et al. *Ibid*, 1941, **1**, 107.

* The substitution of potatoes for sugar, making possible the continuation of treatment on a large scale despite sugar rationing, was first suggested by Dr. Russell Fraser in a personal communication.

TABLE I—INSULIN, LIGHT COMAS, AND SUGAR

Case	Age	Symptoms	Insulin dosage (units)	Days of treatment	Weight: Before treatment	Weight: Gain in lb.	Symptomatic improvement
					st. lb.		
1*	49	D	20—64	48	9 5½	18	+
2*	52	D & H	20— 64	42	7 3	12	+
3	27	A & H	20–152	19	10 2	12	+
4	38	D	20–120	78	11 3	5½	0
5	34	O & A	20— 64	56	9 8	10	+ +
6	43	D	20–140	22	9 6	12	+
7	47	D	20– 80	15	11 4	1	+ +
8	30	D	20–160	88	10 0	5½	0
9	20	D & A	20–200	41	10 5½	15	+ +
10	32	A & H	20–250	61	9 8½	14	+ +
11	34	A & O	20–260	62	10 5½	14	+
12	23	A & H	20–300	43	10 3	8	+
13	28	D & H	20–140	44	11 0	4	0
14	33	D	20— 92	17	9 10	1	0
15	38	A & H	20–145	30	10 7	9	+ +
16	26	A & H	20–130	64	9 12½	24	+ +
17	22	D	30–180	16	10 0½	5	+ +
18	22	D	20–160	18	10 5½	2	+

D, depression; E, epilepsy; A, anxiety; H, hysteria; O, obsessional.
* Cases 1 and 2 were women; all the rest of the series were men.
+ denotes some improvement during treatment.
+ + denotes considerable improvement during treatment.

signs of slipping into light coma, he is at once aroused by a cup of sweet tea and thereby brought round sufficiently to eat the potatoes. The dose of insulin is then reduced slightly the next day. Extra supplies of sugar, and the means of nasal or intravenous interruption, are constantly to hand for use as an emergency measure, but are very seldom required; careful and experienced nursing should do much to obviate their use. This method is almost entirely without danger, and by it as many as 20 patients can be treated in a ward simultaneously if desired. Appetite is often enormously increased; and second and third helpings of potatoes are urged on the patient. A full lunch is provided at 12.15 P.M., and the patients have physical training in the afternoon. So far, no after-shocks have been experienced†, but the patients are not allowed out of the hospital grounds on treatment days except under supervision, and their diet is watched. Treatment is given every day except Sunday; on Saturdays half doses of insulin are given. In successful cases it is continued until physique, appearance, and behaviour return to normal or weight increase stops after an initial steady gain. In practice, the time allowed for each patient is to a certain extent influenced by the number of fresh cases awaiting treatment. Table II records the results obtained in the treatment of 64 patients by this second method. Besides those given in tables I and II, 27 other cases were treated by these methods; 8 of these were schizophrenics; 4 had Cardiazol in addition to insulin; 4 refused to continue treatment; in 11 cases the available records are not entirely complete for various unavoidable reasons; the essential findings in the relevant cases do not differ from those discussed below.

† Since this article was written a further 68 cases have been completed. In 4 instances, mild hypoglycæmic symptoms have been observed in the afternoon; they were quickly relieved when sugar was taken by mouth.

RESULTS

The great difficulty in getting the exhausted neurotic patient to put on weight is only too well known, and some of the large gains in weight shown in the tables are therefore in themselves worthy of record. It may be thought that the mental improvement is entirely secondary to these gains, but it is more probable that they are both symptoms of a common change. It will be noted that the gains in weight in the cases making the best improvement are no greater than the average, and that large gains are sometimes accompanied by little psychiatric benefit, small gains by considerable benefit. It seems likely that other factors, such as the sweating, other autonomic effects, and the general briskening of the metabolism, may also be important.

From the psychiatric point of view, the cases in the first group did not do so well on the whole as those in the second group. There was, however, a difference in the material as well as in the treatment. We soon found that severe cases of depression, especially endogenous in type, and cases with depersonalisation, included in the first group, did not do well, the best results being obtained in men of fairly good personality with anxious, hysterical and depressive symptoms of a reactive type. In these, though long-standing and ingrained neurotic symptoms and tendencies were not relieved in any way, the acute symptoms often diminished.

There were more of these latter cases in the second group. They included men who had broken down in the Flanders retreat or as a result of other severe war stress. Often their condition had passed from the acute to the semi-chronic before they found their way to this unit. Some of them might have been treated with continuous narcosis, had not the insulin treatment seemed so much simpler. Their symptoms were often a mixture of depression, anxiety and hysterical features in a reactive setting, and labelling them would be a matter of opinion.

TABLE II—INSULIN, SUBCOMA, AND POTATOES

Case	Age	Symptoms	Insulin dosage (units)	Days of treatment	Weight: Before treatment	Weight: Gain in lb.	Symptomatic improvement
					st. lb.		
1	25	A & H	20– 60	24	10 4	23	+ +
2	26	A & D	20– 62	21	9 1	15	+ +
3	34	A & H	20– 82	33	10 2	3	+
4	25	A & E	20– 60	16	12 4	6½	0
5	29	D	20– 50	19	13 3	4	+
6	25	D & H	20– 62	18	10 13	6	+
7	36	D	20– 82	33	10 0	10	0
8	30	D	20– 80	16	10 5	19	+ +
9	23	A & H	20– 80	21	8 11	7	+ +
10	38	D	20– 42	26	10 3	6	+ +
11	41	A	20– 60	12	12 0	6	+ +
12	32	D	20– 62	9	11 0	3	+ +
13	26	A & H	20– 50	27	10 1	5	+ +
14	35	A & H	20– 60	18	9 6	7	+
15	26	A	20– 40	20	11 3	14	+ +
16	23	A & D	20– 60	32	12 2	6	+
17	25	A & H	20– 40	39	7 13	12	+
18	28	A & H	20– 72	17	9 0	3	+ +
19	25	A	20– 60	25	10 6½	14	+
20	41	D	20– 30	48	11 0½	8½	+
21	24	A	20– 80	18	10 3	7½	+
22	28	A & H	20– 40	27	10 0	7	+ +
23	37	A & H	20– 50	17	8 10	3	+ +
24	22	D	20– 60	20	8 6	9	+ +
25	23	D & H	20– 70	19	10 10	11	+ +
26	34	A	20– 40	51	8 5	6½	+
27	20	A & H	20– 40	17	8 12	9	+
28	41	D	20– 50	27	9 3	14	+ +
29	24	A & H	20– 40	40	9 10	16	+ +
30	31	A & H	20– 40	17	9 6	10	+
31	29	A & H	20– 60	33	11 4	10	+
32	41	D & H	20– 90	15	10 11	9	+
33	22	A	20– 70	20	10 5	20½	+ +
34	24	D & H	10–100	27	9 6	8	+ +
35	27	D & H	20–100	26	11 0	9½	+ +
36	23	A & H	20– 60	35	10 7½	11½	+
37	46	D	20– 60	22	10 0	12	+
38	21	A & D	20– 60	23	11 5	9	+
39	24	A & H	20– 80	34	10 4	10	+ +
40	37	D & O	20– 90	39	9 10	4	+
41	23	A & D	20–100	27	10 1	2	0
42	21	A & D	20–100	36	9 8	6	+ +
43	29	A & H	20– 50	33	11 11	12	+
44	18	D	20– 40	16	9 5	8	+
45	32	A	20– 60	17	10 0	2½	+ +
46	24	A & D	20– 80	31	10 10½	11½	+
47	30	H & A	20– 40	30	9 11	3	+
48	24	D	20–100	56	10 9	19	+
49	29	D	20–100	43	12 1½	½	0
50	36	A	20– 60	24	9 7½	4½	+
51	20	A & D	20– 60	10	10 7	8	+
52	26	A & H	20– 50	34	9 13	7½	+
53	38	A & H	20– 70	51	11 8½	7	0
54	30	A & D	20– 60	28	10 1½	10½	+ +
55	57	D	10– 20	18	9 6	5	+
56	19	D & A	20– 80	43	11 7	0	0
57	33	D	20–100	58	12 0	6	+
58	41	A & H	20–100	63	8 12½	3½	+
59	37	D	20– 60	50	12 3	13	+ +
60	27	A & D	20– 50	69	8 5½	10½	+
61	26	A & D	20– 90	32	9 0½	8½	+
62	23	A & H	20– 90	29	10 2	7	+
63	34	D	20– 40	39	9 2	12	+ +
64	38	A & H	20– 60	16	10 1	2	+ +

The symptoms most benefited by the treatment were those of exhaustion, lethargy, loss of appetite, despondency, inability to think clearly, and general feelings of tension. Somatic accompaniments of "conditioned" fears, of raids, bombs, aeroplanes and so on might be lessened, but the fears themselves were rarely abolished; they were often too deeply ingrained by the time the patients came for treatment. Improvement generally occurred in the first month. It was helped by superficial psychotherapy and by such other obviously necessary measures as filling in amnesic gaps. The method is of little use against a strong psychological resistance to recovery. It has therefore been found most valuable as a means of speeding up rehabilitation in service or civilian cases, before boarding out of the Army or discharge to take up readjusted duties. There is no reason to think that even the most successful patients, if again exposed to the stresses causing their breakdown, would not relapse.

Psychological factors undoubtedly played a part in the treatment. The patients were often exhausted and showed increased suggestibility. They were receiving a definite treatment after a long period of therapeutic inactivity, or inefficiently carried out duty. Two or three patients in the ward who were doing well influenced the rest. Every encouragement was given to them to eat as much as possible with their improved appetite. But these things did not explain the whole of the improvement obtained. The patients often looked and felt physically better or resembled much more closely the photographs taken of them before their illness. And this return to previous physique, if it could be achieved, was taken as the indication for the cessation of this particular form of treatment.

CONCLUSIONS

The possible uses of modified forms of insulin treatment for soldiers and civilians suffering from depression and various neurotic reactions have been investigated in a large number of cases. Tables showing alterations in weight and symptoms in relation to days of treatment are given for 82 such cases. The following general conclusions were arrived at as to the value of such treatment.

1. Rapid gains in weight and improvement in appetite may often be obtained in neurotic subjects whose general physique has deteriorated under stress.

2. Long-standing neurotic traits, innate in the personality, are not altered. The somatic symptoms accompanying recent "conditioned" fears may sometimes be lessened but the fears themselves rarely abolished.

3. Generalised neurotic anxiety, and hysterical and depressive symptoms in a reactive setting sometimes improve rapidly. The improvement is mainly in the associated symptoms of nervous exhaustion.

4. The greatest improvements do not necessarily coincide with the largest gains in weight. Other factors seem to play a part.

5. Severe cases of depression, especially of the endogenous type, were less helped by the methods used. In other cases, not reported here, convulsion therapy or continuous narcosis has been a useful alternative treatment.

6. The treatment is ineffective against strong psychological resistance to recovery. When used, it should be in conjunction with other established methods of treatment for neurosis and with adjustment of environment.

7. In practice, its main value will be for speeding up normal processes of recovery in patients to be boarded out of the Army, fit to do civilian work, or before they are returned to readjusted duties.

A WELCOME GUEST.—The journal of the Polish Army Medical Corps (*Lekarz Wojskowy*), published in Warsaw up to two years ago, is now being published in London by Thomas Nelson and Sons. The July number, among other things, contains a useful review of the treatment of wounds by Colonel Dr. T. Sokolowski, and a discussion of the special problems of medical services in desert warfare by Lieutenant J. Kwoczyński; the main articles have English summaries.

ACUTE ULCERATIVE STOMATITIS

THREE UNUSUAL CASES

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WE have recently seen three cases of acute ulcerative stomatitis or angina which differed materially from the better known clinical types. Their severity, the peculiar bacteriological findings and the results of treatment led us to think that they should be reported. They were almost identical in their clinical course and were characterised by widespread ulcerative lesions of the lips, buccal cavity and pharynx with an associated mild purulent conjunctivitis. All the patients were acutely ill and two of them showed alarming prostration. Repeated swabs from the ulcerated areas and the conjunctival secretion in all cases yielded pure smears and cultures of an encapsulated gram-positive diplococcus. This organism resembled the pneumococcus morphologically, but subsequent careful investigation showed that it had none of the cultural or serological characteristics of the pneumococcus group. Repeated swabs of the various lesions always yielded pure smears and cultures of the same organism throughout the acute phase of the illness.

Chalier and Ledu (1939) report cases which they call acute pneumococcal angina and from which they recovered pure smears and cultures of the pneumococcus. They suggest that the condition is common but describe only a few of their own cases. They say that many cases with membranous lesions of the tonsils and pharynx which are suspected of being diphtheritic yield smears and cultures of pneumococci, and that most of these cases are mild and clear up rapidly with local measures. However, they report some further cases which were very severe and which were associated with much general toxæmia. In these the usual methods of treatment, including antipneumococcal sera (type not specified), were ineffective. They treated five cases with sterilised beef bile applied locally with apparent success. All their reported cases were febrile and toxic and showed œdema and shallow ulceration associated with an adherent membranous exudate involving the lips, gums, insides of the cheeks, tongue, palate, tonsils and pharynx. Although they state that pure cultures of pneumococci were obtained in all cases they give no evidence that the identification of the organisms was based on anything other than their appearance.

Schmidt-La Baume and Otto (1933) quote three cases. These all had lobar pneumonia with a concurrent ulcerative and pseudomembranous stomatitis due to organisms said to be pneumococci. One of these cases developed a rash from the lesions of which supposed pneumococci were recovered. They also describe a fourth case which had pneumonia, stomatitis and a pustular exanthem from which "pneumococci" were recovered in pure culture. Again identification of the organisms was incomplete and appeared to be only morphological.

It seems that cases of acute ulcerative stomatitis or angina do occur in which an encapsulated diplococcus is the only organism found. Such cases may arise as primary conditions resembling diphtheria, or may be a complication of pneumonia. In all the reported cases there was moderate or high fever accompanied by severe toxæmia. The local condition is characterised by swelling and cyanosis of the mucous membranes of the lips, gums, buccal cavity, palate, fauces, tonsils, tongue and pharynx. There is widespread superficial ulceration with production of an exudate best described as a false membrane which is adherent and bleeds easily on being disturbed. The membrane appears as glistening greyish white patches of varying size which become confluent in the more severe cases. We have to report two similar primary cases and a third secondary to pneumonia.

CASE-HISTORIES

CASE 1.—A French-Canadian soldier, aged 28, was admitted to hospital on Aug. 15, 1940. He was acutely ill and had been

so for two days. His temperature was 102° F., and pulse-rate 120. He had purulent conjunctivitis. His lips were swollen and dusky and their inner surfaces were covered with shallow ulcers on which was a greyish adherent false membrane which bled on removal. The mucous membrane of the whole mouth, including the gums, inner surfaces of the cheeks, palate, tonsils and faucial pillars were similarly affected. The pharynx was reddened and œdematous. He could open his mouth only with difficulty and found it very hard to swallow. There was no odour to the breath. There were a few scattered moist râles and slight blowing breathing at both pulmonary bases. A radiogram of the chest was negative. Swabs were taken of the mouth lesions and conjunctival secretions. Both smears and cultures showed numerous gram-positive encapsulated diplococci which were thought to be pneumococci. No other organisms were seen.

Sulphapyridine was given in gramme doses every four hours. Within two days the chest symptoms and signs had entirely disappeared but the mouth and eyes showed no improvement, the temperature remained elevated and the patient continued to be very ill. Swallowing became more difficult. On Aug. 18 he developed a pustular rash on his legs but this cleared up rapidly without treatment. Unfortunately the pustules were not examined bacteriologically. The conjunctivitis improved from this period on and smears were negative on the fifth day. Sulphapyridine was continued in gramme doses four-hourly until Aug. 22 when a total of 36 g. had been given. During this period his temperature varied from 100·8° to 103·8° F. and he remained acutely ill. The mouth did not improve although the usual non-specific local measures were applied. A severe generalised dermatitis developed which was thought to be due to the drug and it was discontinued on Aug. 22. There were no facilities available for an estimation of the blood sulphapyridine but the fact that he was very cyanosed suggested that it was well absorbed. During this seven-day period repeated swabs of the mouth lesions demonstrated a pure culture of the same organism.

On Aug. 23 his general condition became much worse and resembled the typhoid state. He became apathetic, showed extreme prostration and refused anything by mouth. His temperature ranged up to 104° F. and his pulse became more rapid and thready. Hæmoglobin 80% (Sahli); red cells 4,700,000; white cells 5450. Because of the extreme toxæmia it was decided to give him small whole-blood transfusions, and he received 250 c.cm. of stored whole blood. By next morning he was greatly improved and accepted small quantities of food and drink. He was given another 250 c.cm. of stored whole blood next day and this was repeated on the 29th. During these days he made a spectacular improvement both in his general condition and his mouth. By Sept. 5 his stomatitis had cleared up, apart from small scars on his soft palate. He was discharged from hospital completely well on Sept. 13.

CASE 2.—A Canadian subaltern of English origin, aged 21, was admitted on Oct. 28, 1940. Four days previously his gums and lips had become dry and sore; they became progressively worse and he felt generally ill. On the day of admission he had developed a slight cough and dyspnœa. There was a past history of mild periodic asthma and four months before he had had a similar mouth condition accompanied by fever and general malaise. At that time he was in another hospital and a diagnosis of "trench mouth" had been made, but there was no record of any bacteriological examination. He said that he was not very ill at that time but that his mouth took nearly four weeks to clear up with various local treatments. He was severely ill with a temperature of 101·5° F. There was acute conjunctivitis with thin purulent secretion. His lips were swollen and deeply cyanosed and their inner surfaces had several large shallow ulcers covered with an adherent greyish false membrane which bled on being disturbed. The whole mucous membrane of the mouth was similarly affected and the lesions extended back to the soft palate, tonsillar pillars and pharynx. He had considerable difficulty in opening his mouth and in swallowing. The breath was not fœtid. There were a few scattered sibilant rhonchi in both lungs which disappeared a few hours after admission. X-ray examination of the chest was negative. Smears taken from the ulcers and conjunctival exudate showed numerous gram-positive encapsulated diplococci and pure cultures of these were obtained. No other organisms were found.

He was given sulphapyridine, 8 g., in the first twenty-four hours and 6 g. each day thereafter in divided doses at four-hourly intervals; a total of 26 g. was given before the drug was discontinued on Oct. 31. His condition became steadily worse. Temperature reached a maximum of 103° F. on the first day and subsided a little, to vary from 99·5° to 101° F. He was toxic and drowsy and refused anything by mouth. The pulse-rate remained over 110 and by Nov. 1 it was considered that he was dangerously ill; the white cells on this day were 6500.

In view of our experience in case 1 and his now desperate condition the patient was given 350 c.cm. of stored whole blood on Nov. 1 (twenty-four hours after the drug had been discontinued). Within a few hours there was a striking change in his whole condition. The temperature fell to 99° F. and he began to feel and look very much better. He was able to swallow comfortably that evening. A second transfusion of 250 c.cm. of stored blood was given next day and a third of like amount on Nov. 4. He steadily improved after the first transfusion and by Nov. 5 the mouth and eye conditions had almost gone. The temperature remained normal after Nov. 1. He was discharged completely recovered on Nov. 8.

CASE 3.—A Canadian medical officer of English origin was admitted on Dec. 4, 1940. He had been unwell for several days with slight fever, general malaise and cough. On the day of admission he had a severe chill and the other symptoms became aggravated. His temperature was 102·2° F.; respirations 28 and pulse-rate 120. His eyes were slightly reddened and he was intolerant of light. The pharynx was injected and there were moist râles and blowing breathing in the left lung base posteriorly and in the right upper lobe. A chest radiogram showed some infiltration of the left base and a more definite infiltration of the lower part of the right upper lobe. A diagnosis of bilateral bronchopneumonia was made. The sputum contained mixed organisms with the pneumococcus predominating. Sulphapyridine was given, starting with 2 g., and 1 g. every four hours for two days and then gradually reduced until a total dosage of 30 g. had been given. He slowly improved until his temperature was normal on the fifth day (Dec. 9) when the pulmonary signs and symptoms had gone. During this time he complained of severe headaches in the frontal area and much photophobia. Conjunctivitis was noted from the first day and reached its height on the fifth day. There was a thin purulent conjunctival exudate. Smears from this exudate showed a few gram-positive encapsulated diplococci. As his general condition improved he developed ulcerations on his lips, gums, inner sides of the cheeks and under the tongue much like those described in the other cases but not as severe. Smears and cultures from these lesions yielded nothing but gram-positive encapsulated diplococci. Apart from the local discomfort associated with such lesions he felt well and they healed with local treatment only. He improved rapidly and by Dec. 16 the mouth and eye conditions had disappeared.

DISCUSSION

The outstanding feature of these cases was the finding on repeated examinations of pure cultures of a gram-positive encapsulated diplococcus. The fact that no other organisms were found on direct smear or culture was most striking. Morphologically they could not be distinguished from the pneumococcus and in fact they were considered to be such and the cases were treated accordingly. In the two primary cases adequate dosage of sulphapyridine had no beneficial effect; actually, the patients became steadily worse during its administration. This observation led us to doubt whether we were really dealing with a true pneumococcus and a further study of our cultures was made. Dr. C. J. C. Britton, who made a complete study of the organisms at the Bland-Sutton Institute, reported that although they were encapsulated and lance-shaped gram-positive diplococci they could be grown easily on relatively simple media, did not ferment inulin and were not bile-soluble. A heat-resistance test was not done. The organisms were not agglutinated by any of the pneumococcal typing sera. It was thought that they probably belonged to the streptococcus group and were possibly of the fæcalis type. This may account for the lack of response to sulphapyridine.

Clinically the cases were characterised by the severe local lesions in the mouth and by the extreme general toxæmia. Although the first case made a dramatic recovery after small transfusions of pooled blood we doubted whether these had anything to do with the improvement, so that when the second case came in we felt that he should be given full trial on sulphapyridine,

and this was done. He became progressively worse and on the fifth day the drug was discontinued because it was clearly not benefiting him and was probably making him worse. Next day his prostration was so great that his life seemed in danger. We now started transfusions of pooled blood and again spectacular improvement set in within a few hours. We appreciate that pooled stored blood has little, if any, antibody or complement but the fact remains that immediate improvement followed its use in two successive cases.

King (1940) has drawn attention to the possibility of a deficiency of the pellagra-preventing factor (nicotinic acid) in cases of "trench mouth" and Vincent's disease. Our patients may also have suffered from some deficiency although their stomatitis was associated with the diplococcus described instead of the usual Vincent's organisms. If so, the stored whole blood may have supplemented the deficiency and thereby led to the rapid recovery. With this idea in mind we wanted to use nicotinic acid in the second case but supplies of the drug could not be obtained in time.

The general appearance of the mouths of all three of our cases was compatible with Vincent's disease, but there was no unpleasant odour to the breath and of course the bacteriological examination confirmed the absence of that type of infection. It seems probable that in many of the mild cases of stomatitis which are diagnosed as Vincent's infection without a bacteriological examination such examination would reveal an infection with a similar organism to that we have described, or perhaps others. King's thesis—that ulcero-membranous infections of the mouth with Vincent's organisms are associated with a defective cell metabolism due to a deficiency of part of the vitamin B_2 complex—may also apply to infections with other organisms.

The cases here reported could have been classified as pneumococcal stomatitis if full bacteriological study had not shown that the organisms were not pneumococci. All cases of buccal ulceration seen here are now being examined bacteriologically to determine the frequency of this type of infection.

SUMMARY

Three unusual cases of ulcerative stomatitis are reported in which repeated bacteriological examination showed pure smears and cultures of a gram-positive encapsulated diplococcus which lacked many of the cultural, biological and serological properties of the pneumococcus. A diagnosis of pneumococcal stomatitis should therefore be made with caution.

The disease did not respond to adequate sulphapyridine therapy but transfusions of pooled whole blood seemed to act as a specific. It is suggested that infection of the mouth with organisms other than Vincent's may be associated with a deficiency of nicotinic acid.

We are indebted to Colonel Leonard Colebrook, Dr. C. J. C. Britton and Major Charles Moore for their advice and assistance, and to the Director of Medical Services, Canadian Army (Overseas), for permission to publish this report.

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CALCIUM AND PHOSPHORUS STUDIES IN MYXŒDEMA*

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ON a low daily intake of calcium, such as 0·1 g., the normal person steadily loses about 0·25 g. a day, chiefly in the fæces but also in the urine. In thyrotoxicosis, on a similar intake the loss is much greater. This was clearly demonstrated in 1910 by Towles, later by Aub and his colleagues (1929), and more recently in a study of 33 cases by Beaumont, Dodds and Robertson (1940). It has further been shown by the last two groups of workers that successful subtotal thyroidectomy was accompanied by a return of the calcium balance to normal limits. A natural corollary to these observations would be the demonstration that in myxœdema the calcium output was diminished and that it rose to normal after adequate thyroid therapy. Of 5 cases of myxœdema reported by Aub and his colleagues (1929) only 2 showed an increased calcium loss after thyroid feeding; in the other 3 the calcium loss was actually diminished.

In the present paper the calcium and phosphorus metabolism has been studied in 3 cases of myxœdema before and after thyroid feeding. Observations were also carried out on the serum calcium, inorganic phosphorus and phosphatase to determine whether these substances were altered in myxœdema and whether thyroid feeding changed their concentrations.

CALCIUM AND PHOSPHORUS METABOLISM

In table I the results of the calcium and phosphorus balances in the 3 cases of myxœdema are given. In tables II, III and IV a more detailed analysis of the calcium and phosphorus metabolisms of these cases has been presented.

In view of the variations in the calcium intake the calcium balance was used for comparison. The mean negative calcium balance in myxœdema per three days was 4·78 mg. per kg. body-weight, as compared with 7·58 mg. in my study of 9 normals reported in the first paper of this series. On adequate thyroid medication (during which the basal metabolism rose from − 41 to + 5) the mean negative calcium balance increased to 9·79 mg. Thyroid feeding produced an increased calcium loss in all cases, greatest in the youngest subject. In untreated myxœdema the body stored phosphorus per three days at the rate of 4·21 mg. per kg. of body-weight. Thyroid feeding changed this gain into a loss of 9·88 mg. comparable with the negative balance in normal people of 10·54 mg. per kg. Table IV shows the calcium and phosphorus balance in a case (FB) of myxœdema where the output of these minerals in the urine and fæces was measured separately.

The reduction in calcium output was greater in the urine than the fæces, the calcinuria amounting to 14% of the total calcium output as compared with the normal of 24%. The calcium output rose after thyroid feeding, the increase taking place chiefly in the urine. The reduction in the phosphorus output was also chiefly in the urine, the phosphaturia amounting to 55% of the total phosphorus output as compared with the normal of 70%. After thyroid feeding there was a decided increase in the urinary output of phosphorus and at the same time a fall in the output of phosphorus in the fæces.

TABLE I—CALCIUM AND PHOSPHORUS BALANCES IN 3 CASES OF MYXŒDEMA

Case	Before and after treatment	Calcium per 3-day period			Phosphorus per 3-day period			B.M.R.*	Wt. kg.
		Intake	Output	Balance	Intake	Output	Balance		
		g.	g.	g.	g.	g.	g.		
EZ	Before	0·3	0·73	−0·43	1·47	1·48	−0·01	− 45	93
	After	0·21	0·89	−0·68	1·3	1·98	−0·68	+ 3	89·6
FA	Before	0·26	0·72	−0·46	1·43	0·74	+0·69	− 35	74·3
	After	0·23	0·79	−0·56	1·48	2·31	−0·83	+ 4	70·2
FB	Before	0·29	0·5	−0·21	1·92	1·72	+0·2	− 42	59·9
	After	0·31	1·08	−0·77	1·85	2·42	−0·57	+ 7	55·8

* Standards of Aub and DuBois.

BLOOD-SERUM STUDIES

Calcium.—The blood-serum findings are set out in tables V and VI. The mean serum-calcium in untreated myxœdema is slightly raised above the normal mean but the difference is not significant, according to Fisher's P test (1938), for P = 0·3. Thyroid feeding brought about a fall in the mean serum calcium from 10·51 to 9·85 mg. per 100 c.cm. Statistically this difference is significant, for $P < 0·01$. There is also a significant difference in the levels of the serum-calcium in normal people and in the cases of myxœdema treated with thyroid, for $P < 0·01$. It seems, therefore, from these

* The fourth paper in this series. For references and methods of estimation see the first paper, *Lancet*, July 26, 1941, p. 97.

TABLE II—ANALYSIS OF CALCIUM AND PHOSPHORUS METABOLISM IN 3 CASES OF MYXŒDEMA

Case	Age (yr.)	Before treatment: Calcium balance per 3-day period: Intake (g.)	Output (mg./kg. body-weight)	Balance (mg./kg. body-weight)	Phosphorus balance per 3-day period: Intake (g.)	Output (mg./kg. body-weight)	Balance (mg./kg. body-weight)	B.M.R.	After treatment: Calcium balance per 3-day period: Intake (g.)	Output (mg./kg. body-weight)	Balance (mg./kg. body-weight)	Phosphorus balance per 3-day period: Intake (g.)	Output (mg./kg. body-weight)	Balance (mg./kg. body-weight)	B.M.R.
EZ	54	0·3	7·85	− 4·62	1·47	15·9	0	− 45	0·21	9·93	− 7·58	1·3	22·1	− 7·59	+ 3
FA	60	0·26	9·69	− 6·2	1·43	9·96	+ 9·29	− 35	0·23	11·25	− 7·98	1·48	32·95	− 11·82	+ 4
FB	37	0·29	8·34	− 3·51	1·92	28·73	+ 3·34	− 42	0·31	19·36	− 13·8	1·85	43·35	− 10·22	+ 7
Mean	..	0·28	8·62	− 4·78	1·62	18·2	+ 4·21	− 41	0·25	13·51	− 9·79	1·54	32·8	− 9·88	+ 5

TABLE III—ANALYSIS OF CALCIUM AND PHOSPHORUS METABOLISM IN 3 TREATED AND 3 UNTREATED CASES OF MYXŒDEMA AND 9 NORMAL CONTROLS

—	No. of cases	Three-day periods: Calcium intake (g.)	Phosphorus intake (g.)	Calcium output (mg./kg. body-weight): Mean	Range	Calcium balance (mg./kg. body-weight): Mean	Range	Phosphorus output (mg./kg. body-weight): Mean	Range	Phosphorus balance (mg./kg. body-weight): Mean	Range
Untreated myxœdema	3	0·28	1·62	8·62	7·85 to 9·69	− 4·78	− 3·51 to − 6·29	18·2	9·96 to 28·73	+ 4·21	0 to + 9·29
Treated myxœdema	3	0·25	1·54	13·51	9·93 to 19·36	− 9·79	− 7·58 to − 13·80	32·8	22·1 to 43·35	− 9·88	− 7·59 to − 11·82
Normal controls	9	0·34	1·12	13·3	9·1 to 19·30	−7·58	− 3·85 to − 11·70	31·3	23·4 to 41·5	− 10·54	− 7·39 to − 19·50

TABLE IV—ANALYSIS OF CALCIUM AND PHOSPHORUS METABOLISM IN A CASE (FB) OF MYXŒDEMA. OUTPUT IN FÆCES AND URINE MEASURED SEPARATELY

Three-day periods: Calcium balance: Intake: Bef. (g.)	Aft. (g.)	Output: Urine: Bef. (g.)	Aft. (g.)	Fæces: Bef. (g.)	Aft. (g.)	Phosphorus balance: Intake: Bef. (g.)	Aft. (g.)	Output: Urine: Bef. (g.)	Aft. (g.)	Fæces: Bef. (g.)	Aft. (g.)	B.M.R.: Bef. (g.)	Aft. (g.)
0·29	0·31	0·07	0·51	0·42	0·57	1·92	1·85	0·94	1·94	0·78	0·48	− 42	+ 7

observations that the serum-calcium is normal in myxœdema, and that adequate thyroid therapy causes the serum-calcium to fall below normal.

Phosphorus.—The mean inorganic phosphorus in the serum in untreated myxœdema is slightly raised above the normal mean but the difference is not significant, for $P > 0{\cdot}4$. Thyroid feeding caused the mean inorganic phosphorus to rise from 3·93 to 4·22 mg. per 100 c.cm., and this rise is probably significant, for $P = 0{\cdot}05$. This assumption is supported by the significant difference in the mean inorganic phosphorus level of treated myxœdema and normal controls, for $P < 0{\cdot}01$. These observations show that in myxœdema the serum inorganic phosphorus is normal and that thyroid feeding causes the phosphorus to rise. These findings were not anticipated; with a fall in the serum-calcium I expected a corresponding fall in the inorganic phosphorus similar to that found in thyrotoxicosis. A possible explanation is that given by Albright and others (1931), who described a variation in the serum-calcium and inorganic phosphorus ratio such that their product remained roughly constant. If this is so then this relationship is not present in thyrotoxicosis, where both the serum-calcium

TABLE V—OBSERVATIONS ON THE SERUM IN 9 CASES OF MYXŒDEMA

Case	Duration of thyroid feeding (wk.)	Before treatment: B.M.R.	Calcium (mg./100 c.cm.)	Inorganic phosphorus (mg./100 c.cm.)	Phosphatase (units*)	After treatment: B.M.R.	Calcium (mg./100 c.cm.)	Inorganic phosphorus (mg./100 c.cm.)	Phosphatase (units*)
CY	7	− 28	10·8	4·4	7	+ 6	9·8	4·7	10·8
CZ	10	− 35	10·6	3·9	10·2	+ 4	10·6	4·4	12
DA	12	− 42	10·8	4·5	7	+ 7	10·1	4	6·1
DB	10	− 46	10·4	3·8	6·5	− 12	10·3	4·3	5·7
DC	7	− 29	10·3	4	3·8	+ 9	9	3·8	5·1
DD	9	− 32	10·3	3·8	3	+ 1	9·7	4·2	5·4
DE	6	− 40	10·4	3·9	3·1	+ 1	10	4·1	5·2
DF	5	− 30	11·2	3·6	3·5	+ 12	9·9	4·6	7·3
DG	5	− 30	9·8	3·5	4·6	− 5	9·3	3·9	8·7
Mean	..	− 35	10·51	3·93	5·41	+ 2	9·85	4·22	7·37

* Units of King and Armstrong.

TABLE VI—OBSERVATIONS ON THE BLOOD-SERUM IN 9 TREATED AND 3 UNTREATED CASES OF MYXŒDEMA AND 60 NORMAL CONTROLS

—	Serum calcium: Mean	Standard dev.	Serum inorganic phosphorus: Mean	Standard dev.	Serum phosphatase: Mean	Standard dev.
Normal controls* ..	10·39	0·27	3·83	0·395	7·195	2·03
Untreated myxœdema	10·51	0·4	3·93	0·33	5·41	2·4
Treated myxœdema	9·85	0·49	4·22	0·32	7·37	2·6

* See first paper.

and inorganic phosphorus were found to be below normal.

Phosphatase.—The mean serum-phosphatase in untreated myxœdema is diminished below the normal mean and there is a significant difference, for $P > 0.02$. In comparing the serum phosphatase before and after thyroid feeding it will be noted that the standard deviations are high in proportion to the difference in the respective means. In view of the small number of cases of myxœdema investigated it is unlikely that a significant difference could be demonstrated before and after thyroid medication and this in fact was so, for $P = 0.1$. If however the treated or untreated cases of myxœdema are compared with the 60 normal controls in the first paper in this series it is found that a significant difference exists between the untreated myxœdema and the controls, and that there is no significant difference between the treated myxœdema and the controls. It seems justifiable to conclude that the serum-phosphatase is diminished in myxœdema and that thyroid feeding raises it to normal.

SUMMARY

In 3 cases of myxœdema the negative calcium balance was found to average 4·78 mg. per kg. of body-weight per three-day period, compared with the normal of 7·58 mg. The diminution in output chiefly affected the urine. The phosphorus output was diminished, so that a positive balance was produced. Per three-day period there was a retention of phosphorus amounting to 4·21 mg. per kg. body-weight, compared with a loss, or negative balance, in normal subjects of 10·54 mg. The diminution chiefly affected the urine.

Examination of the blood in myxœdema showed that the calcium and inorganic phosphorus of the serum are normal but that serum-phosphatase is diminished.

Adequate thyroid medication, resulting in a return of the heat output to normal, produced the following changes in the calcium and phosphorus metabolism. The negative calcium balance per three-day period rose from 4·78 mg. per kg. to 9·79 mg., the increased output taking place almost entirely in the urine. There was an increased phosphorus output, changing the balance in three days from a positive one of 4·21 mg. per kg. to a negative one of 9·88 mg., the increase in output taking place only in the urine and being accompanied by a fall in the fæcal output of phosphorus. The immediate effects on the blood-serum were that the serum-calcium fell below normal limits, the inorganic phosphorus rose above normal in proportion to the fallen serum-calcium, and the diminished serum-phosphatase rose to normal limits.

Reviews of Books

Old-age Pensions

An historical and critical study. By Sir ARNOLD WILSON, M.P., and G. S. MACKAY. London: Humphrey Milford, Oxford University Press. Pp. 229. 16*s.*

THIS is the first full description and examination of one of the most important social developments of our time. It should be of great interest and use to every thoughtful citizen and particularly to our profession. It is an impartial and lucid account of the steps which have produced our British system. In the historical section the authors bring out many facts which will be new to the general reader. They show that the duty of making provision for old age and dependency is enjoined in many religious systems. Legislation of the time of Henry VIII assumed that the poor will be supported by voluntary alms, but Elizabeth prescribed compulsion. In the reign of Charles I, attempts were made to establish an elaborate system, far in advance of his times, but the Puritans strongly discouraged anything which tended to diminish personal thrift, an attitude which was closely followed by the friendly societies later, who were the sternest opponents of state assistance. This is brought out in the description of the efforts of Joseph Chamberlain, who became in the 1890's the great champion of old-age pensions. He scornfully said in Parliament "some economists expect from the poor a virtue which we do not find in ourselves." But his efforts to secure legislation were defeated, and he had to acknowledge that "the vested interest in voluntary thrift is overwhelmingly strong." It was Mr. Lloyd George who in 1908 put non-contributory pensions on the Statute Book, and the only opposition came from a small body of "hard-boiled" individualists. The book describes the various steps by which the original non-contributory pension has been raised from 5*s.* to 10*s.* a week, and the maximum income which will attract the full pension from £31 10*s.* a year to £49 17*s.* 6*d.* The authors point out that in July, 1939, this 10*s.* had the same value as 16*s.* had when the earlier rate was fixed. The same full particulars are given of the inception in 1925 and growth since of the contributory schemes, which give to all "insured persons" the right to a pension at 65. There are chapters on the adaptation of the system to war conditions and on old-age pensions in other countries, from which it appears that we were the last country but two out of the twenty-five tabulated as having obligatory schemes, being followed in 1927 by Cuba and Russia. In a concluding chapter we are told of the Labour Party's plea in July, 1939, for a rise in the pension to £1 a week, with 35*s.* for a married couple, followed by the reminder by Neville Chamberlain that the cost of the non-contributory pensions all came out of the general taxpayer and 60% of the contributory, and that the cost to the taxpayer had risen from 8¼ millions in 1909 to over 69 millions in 1939. The means test which is used in dealing with the supplementary pensions of 1940 is considered by the authors as "not a permanency but useful as a quick remedy for a war-time difficulty." They remind us that "all classes may have to revise their ideas as to what is a tolerable part of their income for the state to demand in peace-time, whether as taxes or contributions."

In his foreword Sir George Schuster deals briefly with general principles, and in a long and interesting preface Mr. W. B. Reddaway discusses the vexed question of decreasing fertility.

Applied X Rays

(3rd ed.) By GEORGE L. CLARK, D.Sc. London: McGraw Hill Publishing Co. Pp. 674. 42*s.*

MUCH of this book is inevitably related to non-medical sciences. The study of the physics of X rays crosses the path of medicine little more than does the science of visible light; but though Professor Clark of Illinois gives relatively little space to medicine the book is none the less of considerable interest to those associated with medical radiology. The chapter on the biological effects of X radiation is well set out and up to date, and gives the reader a clear idea of the theories of the actions of X rays on living cells. The second part, which occupies about two-thirds of the volume, deals with the X-ray analysis of the ultimate structure of materials. It makes fascinating reading and illustrates how X rays have revolutionised chemistry in the conception of the structure of solids. Only a generation ago crystallography was a very small branch of chemistry, but since the work of the Braggs X-ray analysis has made it one of the largest and foremost branches.

Annual Review of Physiology

Vol. III. Edited by J. M. LUCK and V. E. HALL, Stanford University. California: American Physiological Society and Annual Reviews Inc. Pp. 784. $5.

THERE are 28 articles by 31 authors in this book which is bigger than volume II, and—in its average level of reviewing—better. A good review should give views as well as news, and there is a welcome increase in the number of contributions in which recent work is evaluated as well as recorded. This trend is well worth an increase in size. The articles on histamine and anaphylaxis (Feldberg), bacterial chemotherapy (E. K. Marshall) and the autonomic nervous system (D. Sheehan) are probably those of most clinical interest, though few are devoid of clinical significance in one respect or another.

AMERICAN DOCTORS FOR BRITAIN.—The response to the request made by the British Red Cross for 1000 American doctors has not so far been large. By the middle of July, 18 doctors were about to leave, and another 56 were soon to follow. The chance that the United States may herself be entering the war is said to be largely responsible.

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IN ACUTE TOXÆMIA OF BURNS—*Lancet*, 1936, June 20th, p. 1400.

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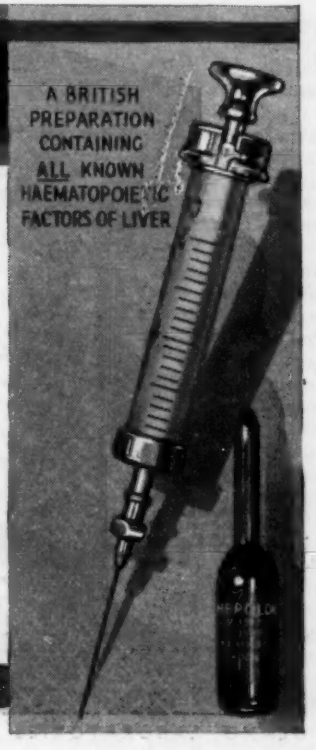

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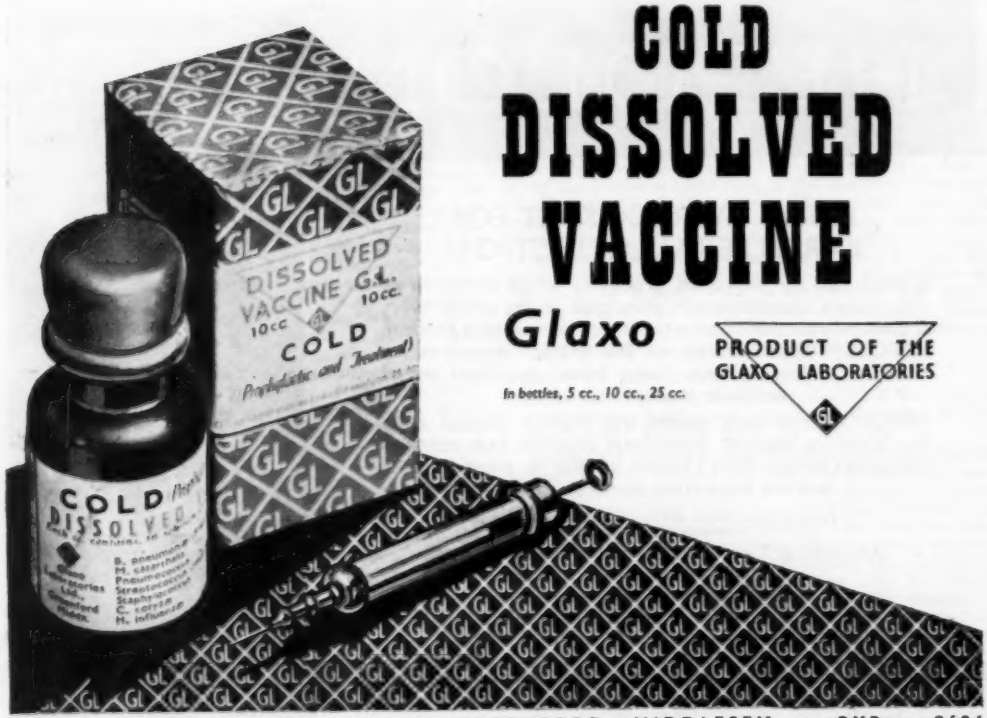

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THE LANCET

LONDON: SATURDAY, AUGUST 23, 1941

VITAMIN E FALLS FROM GRACE

VITAMIN therapy is passing into relative disrepute because one after another of the enthusiastic claims made are being disproved. The sequence of events is often the same. A biochemist feeds lower animals on a purified diet and induces pathological changes that are later prevented or cured by the addition of a concentrate or a pure chemical substance. A new vitamin has been found. The discoverer perhaps suggests human diseases that may be benefited by such therapy because he believes them, often wrongly, to be analogous to the pathological condition in his animals; or the clinician, legitimately encouraged by its manufacturers, tries the new panacea on a few of his patients who loyally say they feel better. Before the series of cases and controls are adequate the results are published, and other clinicians hasten to join what Walshe has aptly termed the vitamin band-waggon. It remains for more cautious workers to investigate the claim laboriously and publish their negative results. This sorry story cannot yet be told about vitamin E, but the fires of enthusiasm already burn less brightly.

We are indebted to H. M. Evans for the discovery and most of the chemistry of vitamin E, and he was the first to show[1] that suckling rats developed paralysis if their mothers were kept on a diet deficient in this factor. The subsequent work on animals, which we reviewed last year[2] culminated in the suggestion of Einarson and Ringsted[3] that amyotrophic lateral sclerosis and tabes dorsalis might be due to deficiency of the vitamin. Clinically, the hypothesis was first put to the test independently by Bicknell[4] and Wechsler. The former treated 18 cases of muscular dystrophy with 1 oz. of dried fresh wheat germ daily, and noted improvement in all except 6 of the 11 cases that he classified as advanced. He also noted improvement in 2 cases of amyotrophic lateral sclerosis and a single case of amyotonia congenita; although he had faith that vitamin E would be of value in tabes, neither of his 2 advanced cases improved. Bicknell believed that the muscular dystrophies, and most probably amyotrophic lateral sclerosis, were deficiency diseases and curable. Wechsler[5] treated 2 cases of amyotrophic lateral sclerosis with the synthetic ester of the vitamin (tocopherol acetate, 9 or 18 mg. daily); one case completely recovered and the other was much improved, but 3 advanced cases did not improve. He believed that vitamin B may aid vitamin E in treatment, and gave his later patients B complex as well as E. Later[6] he reported varying success in 11 of 20 cases of amyotrophic lateral sclerosis that were "carefully observed and consistently treated"; some 30 cases in all were treated. These patients received daily 30–200 mg. of α-tocopherol acetate, 2 teaspoonfuls of wheat-germ oil, a diet rich in vitamin E, with bile salts and the whole vitamin-B complex. More recently,[7] he presented at a meeting 7 cases successfully treated, and could show 4 or 5 others who had partially improved. But he could cite at least 25 patients who had not improved at all with treatment, and assured the meeting that there were at least three and possibly four kinds of amyotrophic lateral sclerosis, of which only one (representing a third or a quarter of all cases) would respond to vitamin E. Stone[8] used wheat-germ oil, 2 ml. a day by mouth, and yeast tablets in the treatment of 5 cases of muscular dystrophy, one patient with muscular atrophy after anterior poliomyelitis, and one with muscular atrophy after multiple neuritis; all improved, particularly when the vitamin-B complex was added. A pure member of the B complex was first used by Antopol and Schotland,[9] who were encouraged by their work on rats to try synthetic vitamin B_6 in the treatment of 6 patients with pseudohypertrophic muscular dystrophy. Considerable improvement was noted in all, but none was cured and one relapsed and became worse despite intensive therapy. This work has not been confirmed.[10] Spies and his colleagues have made optimistic claims for both vitamins B_6 and E. Synthetic α-tocopherol benefited occasional cases of amyotrophic lateral sclerosis[11]; and injection of 500 mg. relieved "neuromuscular symptoms, roaring sensations in the ears, anorexia, and insomnia of selected persons with malnutrition"; 4 people given B_6 became less irritable, less nervous, less weak and less awkward in walking,[12] but this also has not been confirmed[13]; cases of pernicious anæmia in relapse showed a reticulocytosis[14]; improvement was noted in amyotrophic lateral sclerosis,[15] and also in cases of idiopathic epilepsy, myasthenia gravis, and postencephalitic parkinsonism.[16] (Jolliffe[17] found improvement also in non-postencephalitic parkinsonism.) Thus the vitamin band-waggon rumbles along.

Others have not been so successful with vitamins E or B_6 or both together. At the Mayo Clinic[18] synthetic α-tocopherol combined with wheat-germ oil produced no therapeutic benefit in 6 cases of amyotrophic lateral sclerosis, 4 of progressive muscular atrophy and 8 of progressive muscular dystrophy. At the Boston City Hospital[19] 8 cases of motor-neurone degeneration, a case of Erb-Landouzy scapulohumeral and one of Charcot-Marie-Tooth muscular dystrophy, a case of pseudohypertrophic muscular dystrophy and one of amyotonia congenita were treated with an excellent diet, cod-liver oil, vitamin-B complex syrup, vitamins B_1 and B_6 and liver extract intramuscularly, wheat-germ oil and α-tocopherol intramuscularly. In all 12 patients there was either no change or the disease progressed; in 2 definite and early cases of amyotrophic lateral sclerosis there was unabating and rapid progression. From two New York hospitals equally negative results were reported simultaneously. Denker and Scheinman[20] treated 15 cases of amyotrophic lateral sclerosis with large doses of α-tocopherol, both by mouth and by injection, and 4 of these with massive doses of vitamin B_6; no therapeutic results of any value were observed. Ferrebee and others[21] treated 13 cases of pseudohypertrophic muscular dystrophy and 13 of motor-neurone degeneration with wheat germ, Tocopherex, vitamin B_6, and α-tocopherol both by mouth and by injection, and failed in every case to influence the course of the disease; all the 6 cases of amyotrophic lateral sclerosis, which were treated for more than five months, became considerably worse. In this issue we publish Dr. Worster-Drought's series

of 25 cases of motor-neurone disease treated for five to ten months with α-tocopherol acetate or wheat-germ oil; only 2 or possibly 3 improved neurologically, all being patients with amyotrophic lateral sclerosis who received α-tocopherol only.

A year ago we suggested [2] that it would be an advantage in future work if untreated controls were observed, and if analyses of creatine-creatinine excretine were carried out as a more definite indication of the extent of concurrent muscular wastage than was provided by merely subjective impressions. Ferrebee and his colleagues noted no change in the creatinuria and creatine tolerances of 2 cases of pseudohypertrophic muscular dystrophy treated orally and parenterally with α-tocopherol. In Madrid, Vivanco [22] treated 4 cases of progressive muscular atrophy, 1 of dystrophia myotonica and 3 of amyotrophic lateral sclerosis for two months with 2 ml. of wheat-germ oil and 40 g. of dried brewer's yeast daily. The only patients who did not improve were one with progressive muscular dystrophy and 2 with amyotrophic lateral sclerosis. The excretion of creatine and creatinine was observed before and during treatment, and the former not only failed to fall but actually rose in all cases (except one in which it was zero throughout and a second in which no estimations were made), thereby pointing to a true deterioration. Recently Fitzgerald and McArdle [23] have carried out a full and careful investigation of 20 cases of motor-neurone disease and muscular dystrophy. Bemax, Viteolin and synthetic α-tocopherol acetate and vitamin B_6 were administered in large doses. In each case there was no significant clinical improvement, and no biochemical evidence of improvement judged by the daily excretion of creatine and creatinine.

It is difficult to reconcile these conflicting claims. Amyotrophic lateral sclerosis is a disease without remissions, and Wechsler [5] claimed that in one of his patients the weakness returned twice when treatment was stopped. "This is . . . almost absolute proof of the efficacy of the treatment," he said; but it may be objected that the patient knew when his treatment was stopped and started. Fitzgerald and McArdle noted dramatic subjective improvement in one case within an hour of the intravenous injection of vitamin B_6, but equally dramatic improvement followed the injection of saline next day. Yet Antopol and Schotland [9] claimed that one of their patients, who was getting progressively worse, improved with vitamin-B_6 therapy, partially relapsed when saline was substituted, and improved again when B_6 was injected once more. Doyle and Merritt,[19] however, were struck by the variations in the natural course of motor-neurone disease. In one of their cases the rapid onset and progression during the early part of the illness was followed by years of slow advancement. Such variations might lead to a false impression of the value of therapy, and might explain the much smaller percentage of successfully treated cases that Wechsler now claims. For this reason biochemical evidence of improvement is especially valuable. In rats [24] and rabbits [10] with nutritional muscular dystrophy there is an abnormally large excretion of creatine which falls steeply when α-tocopherol is given. In man also the amount of creatine in the urine (on a creatine-free diet) depends on the amount of improperly functioning muscle, and its estimation provides a convenient biochemical method of assessing therapy. All three groups of workers who have used this criterion have found vitamin E and vitamin B_6 completely valueless in human muscular dystrophies and motor-neurone disease. In the earlier papers it seemed that those who used synthetic vitamin E or vitamin B_6 were unsuccessful, whereas those who used whole wheat germ, or the oil combined with the vitamin-B complex, obtained encouraging results. And since it has been maintained,[25] though probably wrongly,[10 26 27] that a water-soluble member of the vitamin-B complex (perhaps the doubtful vitamin B_4) is necessary in addition to vitamin E for the cure of nutritional muscular dystrophy in animals, it seemed that the solution lay in the use of purified vitamin preparations—in fact, vitamin B_1 itself has been claimed [28] to cure nutritional muscular dystrophy produced in animals by a diet deficient in vitamin E. This impression of the advantage of crude over synthetic vitamins proves on closer analysis to be questionable, for some of the most unsuccessful workers [18] used the most extensive therapy. That there is something behind all this no-one can doubt. What it is may yet emerge from further studies, in which untreated controls must also be observed and biochemical tests employed where possible as an adjunct to critical clinical observation.

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GETTING THE BEST FROM GOOD TOOLS

WE have been told that in time of national need we must think of ourselves as links in a chain or cogs in a machine. These similes should help us to remember that chains, cogs and other items of machinery are subject to wear and tear. The good workman looks after his tools because he knows his care will be repaid in time saved at work. A saw that needs resetting is a jibbing delaying tool, and a man that needs a holiday is equally unhandy. During the last war VERNON and his colleagues made a reliable assessment of optimum conditions of work. They collected evidence on the effects of hours of work, arrangement of work periods, lighting, rest pauses and the like, and most of this knowledge had been applied in industry before the armistice. Since 1919 the Industrial Health Research Board has collected more information on these and related subjects which should have safeguarded us against the stupid and extravagant mistakes made in the early stages of the last war. It was worse than disappointing to see,

when this war broke out, an impulsive scamper to increase production by simple increase of the number of hours worked. The knowledge so carefully accumulated during the last twenty-five years was immediately discarded. The facts, however, remained the same, and it soon became clear that the initial output achieved by this misguided burst of energy could not be maintained. Absenteeism and sickness-rates increased as scientists knew they must, and production suffered with the producers. Some of the worst abuses were remedied, but though members of the Government, from the Prime Minister downwards, have stated the principle often enough, there is still no general realisation that only by keeping demands on the workers within physiological limits can output be maintained at its maximum level.

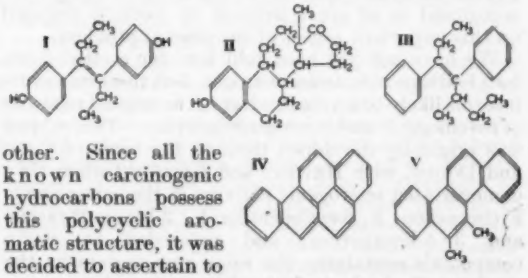
We have an outstanding opportunity at present to assess the needs of workers, especially those whose duties make an unusually heavy demand on them; and to formulate scientific procedures which would help us to place men in jobs appropriate to their capacity. Only a small proportion of men boarded out of the Army find suitable work: too often they are left to fend for themselves, to gravitate into any job they are able to get, or to sink into a state of chronic incapacity which not only destroys their contribution to the national output but may at last bring them into the ranks of an army of misfits similar to that left by the last war. Lord BEAVERBROOK, speaking of Watt's work on radiolocation, said: "Technical developments make progress in war which sometimes outstrips all that has gone before. . . . It is the scientist who will heal our wounds. It is the scientist who will protect us against the loss of our life-blood." Perhaps; but science can do nothing if the knowledge it makes available is neglected.

Recently the zeal of miners has been questioned, often by people without knowledge of the risk and strain of coal-mining. The accident-rate among miners is three times as great as among workers in other industries. Their work is heavy and carried out in distorted postures, under working conditions which inevitably fall short of those demanded and enforced in industries above ground. Men in the insured population as a whole are incapacitated by sickness for an average of 8·7 days a year; in miners the corresponding period is 18 days; and many incapacitating conditions—septic and inflammatory skin conditions, rheumatic disease, anæmia and gastritis—are two or three times as common among miners as among the general population. Fatal accidents at the coal face increased from 783 in 1939 to 910 in 1940; a similar rise was observed in 1914–18. Work carrying such hazards deserves a specially good health service; and it may even be that in order to maintain his full efficiency the miner must have special concessions over and above his 8 oz. of cheese when foodstuffs and clothing are being apportioned. The Minister of Labour has already agreed that it would probably be better to allow the present miners 2*s*. 6*d*. worth of meat a week than take back another 10,000 men. If further investigation shows that rationing concessions to miners are justified, no administrative difficulties should be allowed to stand in the way. Colonel WALTER ELLIOT has suggested[1] that feeding on the spot, in works and canteens, is one way of ensuring that supplementary rations get to those who most need them. It should not be an impossible piece of research to determine the quantities and types of foodstuffs needed.

1. See *Lancet*, Aug. 16, 1941, p. 203.

NEW WORK ON CARCINOGENESIS

SOME three years ago DODDS, GOLBERG, LAWSON and ROBINSON,[1] in an account of the œstrogenic activity of certain derivatives of diphenylethane and stilbene, drew attention to the structural resemblance between the molecules of diethylstilbœstrol (I) and œstrone (II). The comparison indicated that by ring closure there could be obtained from diethylstilbœstrol a condensed carbon ring compound similar to œstrone on the one hand and to chrysene on the other. Since all the known carcinogenic hydrocarbons possess this polycyclic aromatic structure, it was decided to ascertain to what extent the condensed rings of the carcinogens might be disrupted without a complete loss of the characteristic biological activity. DODDS, LAWSON and WILLIAMS[2] have now reported that two tumours have developed in mice which had been painted for considerable periods with a solution in benzene of α-ethyl-β-*sec*-butylstilbene (III). This possesses a skeletal resemblance to 3 : 4-benzpyrene (IV) and 1 : 2-dimethylchrysene (V), the carcinogenic activity of which had previously been described by COOK and others.[3] The tumours obtained by DODDS and his collaborators were unusual in that both were spindle-celled, one being a spindle-celled epithelioma and the second apparently a sarcoma—that is, they were of histological types not commonly encountered after the application of carcinogenic agents to the skin in mice. It should also be noted that the connective-tissue tumour arose not in the painted area but subcutaneously about 2 cm. away. Yet there can be no doubt that these tumours were malignant and, although attempts to transplant the first failed, fragments of the sarcoma were successfully grafted in stock mice. The yield of tumours is undoubtedly low, and the latent period of induction moderately long, since the first tumour developed in one of a group of seven mice after 12 months' painting, and the second in one of a group of thirteen after 15 months; these groups were the survivors from two series of twenty-five adult stock male mice with which the experiment was started. It is obviously desirable that the experiment should be repeated, and this is being done. If the results are confirmed, this will be the first description of carcinogenesis associated with a hydrocarbon not possessing a condensed structure.



The new observation can reasonably be expected to modify our conceptions of the relation between molecular composition and carcinogenic activity. The intensive investigations of the past decade on carcinogenesis by pure chemical compounds have

shown this type of biological activity to depend in general on an optimal degree of molecular complexity, and in particular on certain more specific requirements. While it was known that molecular simplification might proceed to a restricted extent without complete loss of potency, the carcinogenic activity of the new analogue, albeit slight, suggests that the limits of such simplification may be wider than has been supposed. The systematic examination of synthetic carcinogens is directed in part to an understanding of the mechanisms by which tumour-producing compounds may be formed in vivo, as is assumed to be probable at least in certain cases. Hence, evidence of the production of cancer by compounds of simpler structure than has previously been recognised is of great interest to workers engaged on this important aspect of the general problem.

We have not yet been told how far α-ethyl-β-*sec*-butylstilbene acts as an œstrogen, but from its nature it seems likely to revive interest in the mutual relations of carcinogenic and œstrogenic activity. This subject was originally developed through the work of COOK and DODDS, with HEWETT and LAWSON,[4] when they demonstrated œstrogenic activity in the carcinogenic hydrocarbons 5 : 6-*cyclo*penteno-1 : 2-benzanthracene and 3 : 4-benzpyrene, and proceeded to study compounds containing the same ring system as the carcinogenic hydrocarbons, but with polar groups present and some rings reduced. A subsequent inclination on the part of others to exaggerate the significance of a superficial structural resemblance between œstrogenic and carcinogenic agents was followed by a phase in which the importance of any such relation tended to be minimised. The latest work, and particularly the extension of it which is promised, may lead to a reinvestigation of this larger problem. Yet another subject likely to be advanced is the study of the growth-inhibitory properties of carcinogenic compounds[5] in connexion both with the cellular physiology of tumour induction[6] and the search for inhibitory compounds of possible therapeutic value. This property of tumour-producing hydrocarbons had already found some sort of parallel in the growth-inhibitory effects recorded by ZONDEK[7] for "folliculin" and by NOBLE[8] and GAARENSTROOM and LEVIE[9] for diethylstilbœstrol. Thus this suggestive finding, if it is fully confirmed, may stimulate inquiry in many diverse but related fields. It also gives ground for the belief that although (or perhaps because) these fields have yielded richly to investigation in the past, equal or greater crops may be expected from them in future.

1. Dodds, E. C., Golberg, L., Lawson, W. and Robinson, R. *Nature, Lond.* 1938, **141**, 247.—2. Dodds, Lawson and Williams, P. C. *Ibid*, 1941, **148**, 142.—3. Cook, J. W. Hewett, C. L. and Hieger, I. *Ibid*, 1932, **130**, 926; Badger, G. M., Cook, Hewett, Kennaway, E. L., Kennaway, N. M., Martin, R. H. and Robinson, A. M. *Proc. Roy. Soc.* B, 1940, **129**, 439.—4. Cook, and Dodds, *Nature, Lond.* 1933, **131**, 205. Cook, Dodds, Hewett and Lawson, *Proc. Roy. Soc.* B, 1934, **114**, 272.—5. Haddow, A. and Robinson, *Ibid*, 1937, **122**, 442; *Ibid*, 1939, **127**, 277.—6. Haddow, *Acta Un. int. contre Canc.* 1938, **3**, 342.—7. Zondek, B. *Lancet*, 1936, **2**, 842.—8. Noble, R. L. *J. Endocrinol.* 1939, **1**, 128.—9. Gaarenstroom, J. H. and Levie, L. H. *Ibid*, p. 420.

Annotations

DRUG-FAST BACTERIA

DRUG-RESISTANCE or drug-fastness was first noted in trypanosomal infections, from which most of our knowledge of the phenomenon is derived. It is, for example, easier to induce drug-resistance in vivo than in vitro, trypanosomes rendered resistant to one drug are usually resistant to chemically-related substances, and strains may be drug-fast in one host but not in another. Bacteria can be trained to tolerate increasing doses of a particular antiseptic in vitro, and in practice it is often found useful to change the antiseptic in a dressing if good results are not quickly obtained. Evidence suggestive of resistance to the sulphonamides among a variety of bacterial pathogens has gradually been accumulating. It was early noted in the treatment of gonorrhœa with sulphanilamide that a proportion of cases failed to react to the drug, or relapsed with persistent discharge despite further treatment. These refractory cases, usually attributed to insufficient early dosage, have mostly responded to treatment with the more active sulphapyridine, but even with it a small proportion of infections fail to clear up. Drug-resistant pneumococci also occur. Thus, Ross[1] described two cultures of a pneumococcus isolated from a patient with meningitis—the first, obtained shortly after commencement of treatment with sulphapyridine, was sensitive to the drug; the second, obtained post mortem and apparently identical culturally and in virulence with the first, was drug-resistant. Differences in susceptibility to sulphapyridine among laboratory strains of the pneumococcus, apart from serological type, has been noted by MacLean, Rogers and Fleming,[2] and a similar phenomenon has just been recorded by Florey and his colleagues for penicillin. Streptococcal infections resistant to the sulphonamides are sometimes encountered, and Colebrook and Francis[3] have now isolated drug-resistant strains of hæmolytic streptococci from wounds powdered with sulphanilamide preparatory to skin-grafting. These strains, detected by their growth on specially prepared sulphanilamide-containing blood-agar plates, belonged to four different serological types, and were apparently equally resistant to sulphapyridine, sulphathiazole and sulphadiazine. Besides preventing successful skin-grafts, they were responsible for secondary infection of other wounds in the same ward. Such an occurrence obviously raises new problems in the control of streptococcal cross-infection. It is not yet known if these sulphonamide-fast streptococci are also resistant to unrelated antiseptics, like proflavine or penicillin, which could replace sulphanilamide for local application. Nor is it known if drug-fastness is always acquired or if some strains are naturally resistant. If the acquisition of resistance is most often due, as seems likely, to inadequate early dosage with the appropriate sulphonamide, a warning is needed against the prescription, too common in general practice, of almost homœopathic doses of the drug. "Strike hard and strike early" must be the watchword in chemotherapy.

1. Ross, R. W. *Lancet*, 1939, **1**, 1207.
2. MacLean, I. H., Rogers, K. B. and Fleming, A. *Ibid*, **1**, p. 562.
3. Colebrook, L. and Francis, A. E. *J. Path. Bact.* July 1941, p. 155.

CONSTIPATION IN WAR-TIME

THE physical results of going short of food were fully observed in the last war, more especially among the Austrians but to some extent in our own people and notably in our British and Indian garrison at Kut. This time the majority of our population have suffered, if they have suffered at all, only from monotony, but since variety in dishes and flavours aids digestion and cheers the heart the advisers of the Ministry of Food are wise to encourage the production of vegetables and herbs used in pickle-making and the conversion of most of our season's fruit crop into preserves of all kinds. There have been some, however, who have found the war-time diet upsetting to their bowel habits. A reduction in total consumption, and especially in fruit and sometimes beer, has made some people constipated, while others have compensated for less meat with too much vegetables

and have brought on diarrhœa. Apart from an unusual awareness of the abdomen, the layman can only judge the state of his intestine by the excreta, speaking of constipation when the motions are few and the fæces hard. For the doctor constipation is only present if the residue of food taken is unduly delayed. If a couple of teaspoonsful of charcoal is swallowed most of it should appear about 48 hours later, though some may be held in the large intestine and be passed a day or two afterwards. The timetable of movement through the stomach and small intestine differs little in normal people, but there is considerable variation in the rate of progress through the colon even in perfect health. Radiology has shown that there is not a steady forward movement; after an accumulation in the cæcum and proximal colon a giant contraction takes place at intervals which moves the mass of residues through the rest of the colon and is intended to result in evacuation. The mass movement seems to be set up by taking more food into the stomach, but the evacuation can usually be deferred by voluntary closure of the anal sphincter. Mass movement is thus dependent on there being enough residue in the ascending colon to form a mass, and may be reduced in force if the diet contains little indigestible material, or if the muscle of the bowel wall is weak. But in a great number of the so-called constipated the delay is in the terminal colon from habitual inhibition of the defæcation reflex, and this bad habit may be encouraged by the rush and bustle of war-time and the shortage and awkwardness of lavatory accommodation to which hostels and the like are prone. The war worker, then, even if he cannot choose the diet which suits him best, will be wise to keep his meals and his times for defæcation as regular and unhurried as circumstances allow.

CONGENITAL MALARIA

THE existence of congenital malaria has been doubted because the causative parasites have never been convincingly demonstrated either in the fœtal portion of the placenta or in blood from the umbilical cord, but in view of the number of authentic case-records it must now be admitted that transplacental infection does take place, and what applies to malaria applies equally to other protozoal blood infections, such as trypanosomiasis and leishmaniasis. The exact mechanism is still conjectural Some have thought there must be a mechanical tear or other damage so that there is no longer a sharp separation between maternal and fœtal blood, but in several cases the placenta has been found apparently undamaged. It is also possible that malarial infection induces pathological changes in the placenta itself, thus facilitating the passage of parasites to the fœtal circulation, or they may reach the fœtus through a placental hæmorrhage. If a genuine case of transplacental infection is to be claimed the child must be born in a locality where malaria is not endemic and anopheline mosquitoes capable of transmitting malaria are not found, or, if the child is born in an endemic area, infection must take place at a time of the year when infected anophelines are absent. A further condition is that the interval between the birth of the child and the demonstration of parasites in the blood should be shorter than the shortest incubation period of malaria. Hoo [1] reports that on Aug. 2, 1940, an infant aged 14 days was taken to the Pædiatric Clinic in Amsterdam with the provisional diagnosis of quinine-poisoning. The child was breast-fed, and the mother, who suffered from repeated attacks of malaria, had taken much quinine in the preceding days. Directly after parturition the mother had an attack of fever and 4 days afterwards malaria parasites (benign tertian) were found in her blood. The father and one of the other children (seven in the family) had also suffered from the fever which is indigenous to the Northern districts of Amsterdam. On the third day the child developed icterus neonatorum, with a loud systolic basal murmur; the spleen was not palpable. The probable diagnosis of quinine poisoning was negatived by the absence of the alkaloid in the urine, as well as in the mother's milk. At the age of 20 days ring forms of the benign tertian parasite were demonstrated in the child's blood. At no time was there high fever, an enlarged spleen or other signs of malarial infection. The provisional diagnosis of congenital heart disease was confirmed at autopsy 80 days after birth. The immediate cause of death was double otitis media. Diffuse malarial pigmentation was demonstrated in the liver and spleen. There is one loophole in the evidence—the child may have been bitten by an infected mosquito after birth—but the large number of gametocytes of *Plasmodium vivax* in the blood on the 24th day of life is definitely against an extrauterine infection. Moreover it has been shown [2] that from May 1 to Aug. 15, only 0·4% of local anophelines are infective. Hoo gives references to similar occurrences in the Dutch literature and cases have been reported from France, America and Italy. Malaria parasites have been demonstrated by Buckingham [3] in fœtal blood in China, and Jean & Van Nitsen [4] found malarial schizonts in the spleen of six stillborn children in Katanga (Belgian Congo). Examples of congenital transmission of benign tertian malaria in England have been reported. Thus Tanner and Hewlett [5] described a case in one of twins born of a malarial mother in London, and Llewelyn Jones and Brown [6] demonstrated a heavy infection in the blood of a baby aged 16 days born in Buckinghamshire, the mother having apparently acquired malaria in England during the last two months of pregnancy. Most of these records refer to benign tertian malaria, but Heiser has told of an infant aged 7 days with crescents of *P. falciparum* in its blood. Wickramasuriya [7] in Ceylon thinks that congenital transmission of the latter parasite is comparatively common there. Blacklock & Gordon [8] have effectively shown that enormous concentrations of the subtertian parasite can be demonstrated in the placentas of native women in Sierra Leone and that this parasite is responsible for premature and stillborn births. The evidence must then be accepted, and since transmission from mother to fœtus can occur it seems strange that it happens so seldom.

INTIMAL HÆMORRHAGE IN CORONARY OCCLUSION

MOST pathologists agree that coronary sclerosis is the most important common factor in the various causes of occlusion of these vessels, but many views are held as to the precise nature of the lesion leading up ot the occlusion. M. G. Nelson of Belfast [9] urges the importance of hæmorrhage in and around the intima of the coronary vessel. Authorities differ as to how the artery gets its blood-supply in health, but Nelson has confirmed that atherosclerotic vessels are well vascularised. Capillaries may be found in the intima of atherosclerotic vessels at two sites, one on the deeper aspect in close proximity to the media of the adventitia, and the other beneath the endothelium. Those at the former site are derived from the vasa vasorum of the adventitia. In both cases these vessels are of the nature of sinusoidal capillaries; they are usually found in relation to intimal

1. Hoo, P. G. *Acta pædiatr.* 1941, **28**, 293.
2. Swellengrebel, N. H. and de Buck, A. Malaria in the Netherlands, Amsterdam, 1938.
3. Buckingham, E. W. *Chin. med. J.* 1925, **39**, 1140.
4. Jean, L. and Van Nitsen, R. *Bull. med. Katanga*, 1927, **4**, 131, 133.
5. Tanner, N. C. and Hewlett, R. F. L. *Lancet*, 1935, **2**, 369.
6. Llewelyn Jones, J. and Brown, H. C. *Ibid*, 1924, **2**, 1058.
7. Wickramasuriya, E. A. W. Malaria and Ankylostomiasis in the Pregnant Woman, London, 1937.
8. Blacklock, B. and Gordon, R. M. *Ann. trop. Med. Parasit.* 1925, **19**, 37, 327.
9. *J. Path. Bact.* August, 1941, p. 105.

atheromatous plaques and are surrounded by chronic inflammatory changes. In a series of cases examined, Nelson found that hæmorrhage from these sinusoids was not uncommon. Such hæmorrhages in the deeper zones of the intima healed by granulation tissue in which new capillaries were numerous. An increase of fibrosis evidently then followed and predisposed the patient to a further hæmorrhage, a vicious circle then being set up. The condition was present in 11 out of 17 instances investigated, and in 9 thrombotic occlusion of the lumen was also present. The factors determining the intimal hæmorrhage are probably weakening of the sinusoidal wall by toxic action and transient raised intraluminar pressure induced by exertion or emotion.

WAR INJURIES OF THE LUNGS

IT is wise to remember, as Sir Joseph Barcroft pointed out in opening the discussion on lung injuries at Porton reported in our columns last week (p. 197), that while the aerial offensive on England has not as yet included gas attacks, not only H.E. but gas bombs may be used in future raids. Both can cause lung injuries, and the discussion concerned itself with the clinical differentiation of the two types of pulmonary damage. Those who took part agreed that histologically the differentiation is relatively straightforward. Gases which act on the lungs cause bronchial spasm, destroy the bronchial mucous membrane, damage the alveolar walls, and produce acute pulmonary œdema. Pulmonary damage which occurs as a result of H.E. explosions takes the form of hæmorrhagic lesions, which may be associated with signs of pulmonary fat-embolism, and occasionally with those of carbon-monoxide poisoning. It is to be hoped that future events—if they materialise—will justify the optimism of the participants in the discussion, and that it will be as simple to make a differential clinical diagnosis of nonfatal forms of lung damage as it is to differentiate them histologically in the dead. At present it is undoubtedly true that not enough is generally known about the pulmonary changes which occur in H.E. incidents to distinguish the factors which may be responsible for different types of lung damage. However obvious it may sound, Professor Ryle's suggestion that the differentiation of pulmonary injuries would be assisted by the knowledge of the history of the incidents responsible for them should be firmly borne in mind, to help in distinguishing not only gas injury from H.E. injury but also one form of H.E. injury from another. The lack of such histories may well make the problem of a combination of gas and H.E. injury in the same casualties not just "more complex" as Prof. Shaw Dunn remarked, but completely insoluble.

THE AUTONOMIC NERVOUS SYSTEM

THE sympathetic chain was so called because of its numerous connexions with other nerves. It was supposed to be the major factor in mediating "sympathies," or reactions accompanying but bearing no direct relation to the main reaction; an example being the pupillary constriction in a blind eye accompanying the constriction in the illuminated seeing eye. "Sympathetic" has now become a purely anatomical term, applied to the autonomic outflow from the thoracic and lumbar segments. The term parasympathetic, also anatomical, refers to the cranial and sacral outflows which overlap the sympathetic peripherally, acting usually in the opposite sense. One of the outstanding discoveries of the last twenty years has been that autonomic postganglionic fibres can be classified on a physiological basis into those which act by liberating acetylcholine (cholinergic) and those which liberate an adrenaline-like substance (adrenergic) at the effector organ. The partition between cholinergic and adrenergic corresponds roughly, but not exactly, to the parasympathetic and sympathetic systems respectively. In a historical survey and a later review [1] of modern work on the autonomic, Sheehan points out that, concurrently with these studies of humoral transmission of impulses, there has been a growing realisation that the autonomic is not a system on its own; it has not only intimate associations with the spinal cord, of which it is an outgrowth, but important connexions with higher centres, to which it is subordinate. Interest at present centres chiefly in the hypothalamus, but there is no doubt that the cerebrum, especially the precentral cortex, also influences the autonomic. The activity of any group of cells in the central nervous system depends on the intensity of its "excitatory state." Such a group might have either a predominantly visceral or a predominantly somatic function: yet its final activity might be determined—perhaps raised above a significant threshold—by a quite subsidiary access of excitation from the complementary source. This seems further evidence that the autonomic and somatic nervous systems are inseparable.

ANATOMY OF INGUINAL HERNIA

DESCRIPTIONS of the surgical anatomy of the inguinal region usually assume that the arrangements of the structures met with at operation for hernia is the same as is found in dissection of the normal, non-herniated subject. Ashley and Anson [2] have made careful dissections to decide how far this is true. They found that indirect passage of a fairly large hernia did not take place—the peritoneal sac passed through the wall directly, in its course displacing the inferior epigastric artery inwards, so that the first part of the artery passed almost horizontally, and then turned at a right angle to pass upwards behind the rectus abdominis muscle. Hesselbach's triangle did not exist. The inferior epigastric vessels were thus important medial and inferior relations of the neck of the sac. The sac had a more medial disposition than is conventionally described, and on the floor of the abdominal ostium was formed by the iliac vessels, the anomalous obturator (present in this case), the ductus deferens and the internal spermatic vessels. Their other main observation was concerned with the identity of the various coverings of the hernial sac. These are usually described as the external spermatic fascia, derived from the external oblique; the cremasteric fascia and muscle, derived from the internal oblique; and the internal spermatic fascia, derived from the transversalis muscle. By dissection the coverings were identified and separated in the scrotum and traced upwards to the parietal layers of the abdominal wall. It was found that they could be definitely followed to their source. In all cases examined the contribution from the external oblique was entirely fascial, consisting of the conjoined fascia which invests the two aspects of the muscle. In the cremasteric layer scattered muscle fibres were identifiable, but there were no definite aponeurotic fibres, and it was concluded that this layer was predominately fascial. The internal spermatic covering represented a fusion of the thin outer lamina of the fascia investing the transversalis and ileopsoas muscles and the thicker inner one, commonly known as the transversalis fascia.

Mr. E. Rock Carling, senior surgeon to the Westminster Hospital, and Dr. S. P. Bedson, F.R.S., professor of bacteriology in the University of London at the London Hospital, have been appointed members of the Medical Research Council, in succession to Prof. G. E. Gask and Dr. W. W. C. Topley, F.R.S., who retire on Sept. 30.

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1. Sheehan, D. *Arch. Neurol. Psychiat.* 1936, **35**, 1081; *Ann Rev. Physiol.* 1941, **3** (reviewed on page 218).
2. Ashley, F. L. and Anson, B. J. *Quart. Bull. Nthwest Univ.* 1941, **15**, 114.

Special Articles

MEDICAL SERVICE FOR THE HOME GUARD *

G. B. SHIRLAW, L.R.C.P.E.
ASSISTANT MEDICAL OFFICER (A.R.P.) FOR BATTERSEA

PROVISION of a medical service for Home Guard detachments serving in urban areas is not a question of devising new means but of using those which exist already. It has now been officially announced that doctors can be enrolled in the force. Health problems will not normally be considerable, for the men will be covered by national health insurance. A close watch should be kept on older men, who may develop ailments resulting from overstrain; and guard duty involving long hours on their feet may mean foot troubles for the sedentary workers; but during the period of waiting the chief duty of the doctor in charge will be planning his casualty service for when trouble starts.

THE COAST TOWN

The Home Guard M.O. and his colleagues will work directly under the local command, and in close contact with the heads of both civil and military medical services. If a town is of great strategic importance—on the coast, for instance, and in the obvious path of the invader—it may be assumed that in a serious attack the military authorities will take over everything, evacuating as far as possible the civilian population, or at least sending it to shelter when battle is imminent. The military will probably use existing stations which the civil-defence organisations have established—first-aid posts, ambulance depots and decontamination plants—and they will certainly make use of any hospitals sufficiently removed from the main zone of battle which are still functioning. The Home Guard doctor will find himself part of a well thought out system.

If this complete absorption of the civilian casualty services takes place there will be some obvious difficulties. As an example, there are two patterns of stretcher in use in this country—Army and A.R.P. They fit two different types of ambulance and are not interchangeable. Few things are worse for a casualty than shifting from one stretcher to another. Wounds are reopened, pain is restarted, fractures are jarred; shock, which may be passing off, is suddenly intensified by hurried and unexpected handling. It is the aim of casualty organisation to reduce such disturbance to a minimum. The Home Guard doctor who has foreseen this difficulty and has made plans to avoid it—either by careful ear-marking of ambulances or some device (if that is possible) producing interchangeability—will have done a good service to his area.

If the military take charge of a coast zone it by no means follows that the Home Guard will be absorbed completely. The type of situation most likely to arise is a shore battle area under absolute military control, and lines of communication guarded at frequent intervals by bodies of local volunteers. These lines will be under continuous bombardment from the air and there will be a fair number of casualties. Civilians nearby will also suffer, and the normal A.R.P. services will deal both with them and with any injured members of the Home Guard. But suppose the first attack is held. If the area has been badly strafed advantage will be taken of the first respite to get civilians back out of danger. Special routes may be allotted to them so that military needs are not encumbered and the Home Guard may conceivably have the task of shepherding the refugees. Once this is done the guardsmen will return to their defence duties, but now they may be working in an area from which civil casualty services have been evacuated. The Army will have its hands full. The Home Guard doctor who has not planned in advance for this emergency will have to improvise his own medical service under very adverse conditions. If the whole subject has been considered during the training period and proper liaison established with the military and A.R.P. authorities no hiatus will occur. Certain civil defence units will remain to serve the H.G. posts along the communications, or the R.A.M.C. may have the situation in hand.

THE INLAND TOWN

In the large inland city an entirely different problem exists. It is in the highest degree unlikely that the enemy advance having established shore bases will be able to attack industrial cities en masse; if such a break through occurs it will appear for the moment almost invincible yet will in reality be of astonishing vulnerability. Invasion attacks, however they spread their branches, suffer from a serious root weakness. Already naval reinforcements may be striking a shrewd blow which will smash the source from which the attackers' strength is drawn. Soon the snared battalions will advance not from choice but only because all possibility of retreat is denied them. This point of strategy should be made widely known.

Granted the unlikelihood of such attacks developing, the duties of the Home Guard M.O. in inland towns of any size will best be carried out in conjunction with the A.R.P. authorities. Large numbers of regular troops, bringing with them the R.A.M.C., are not likely to be stationed in cities like Birmingham and Manchester. Attack upon such centres will be by air bombardment and by parachutists. The Home Guard will have to withstand the one menace and rapidly finish off the other. If air attack is so severe that the city is devastated, then the military may have to be called in to aid the civil defences. Fire-fighting, care of wounded, maintenance of essential supplies, and the preservation of morale might in the last resort require the presence of the Regular Army; but the soldiers would not come in large numbers and would leave as soon as their work was done. Assuming that attacks on large towns take place on the lines here indicated, the Home Guard M.O. will probably have to rely entirely on the coöperation of the civil defences.

In the town as in the country the main functions of the Home Guard are static. The essence of a casualty service is, on the other hand, mobility. Casualties have to be evacuated; the local volunteer force must always, at all costs, stand firm. The Home Guard will sometimes be acting as besiegers and sometimes besieged. From the point of view of the H.G. medical officer the handling of casualties can be thought of in terms of these two phases of action. Either phase may at short notice develop into the other. Evacuation of casualties may take place in three ways:—

(*a*) Siege evacuation—the withdrawal of wounded to some safer central point in a building or area which the enemy have surrounded.

(*b*) Local evacuation—the removal of casualties to safety from a fluctuating line of strong points or barricades.

(*c*) Total evacuation—the withdrawal of wounded from an area made completely untenable from the casualty point of view.

When the H.G. defences of a factory are planned as a unit some point must be set aside as an aid-post. It should be as bomb-proof as possible and self-contained in equipment. Electric water heaters, for example, are not much use when an enemy has cut the cable, nor is a brightly polished tap of value when the water has ceased to flow. Each Home Guard section must have what in the Regular Army would be termed its regimental aid-post, and when this is near an objective likely to be bombed it must have corresponding protection. A few sandbags and a piece of board nailed across a window are not enough. In cities the aid-post should be underground and beneath as many floors as possible of reinforced concrete. Such places are reasonably common and usually part of them can well be spared for casualty service work. All underground posts should be as big as possible even if the equipment provided is not in proportion to their size. In a heavily bombed town the hospitals might become either overcrowded or unusable and damage to communications might make the working of official evacuation schemes very difficult. Equipment salvaged from damaged hospitals can be quickly installed in underground aid-posts if space is available, and if the posts are of sufficient capacity large numbers of wounded can be tended till evacuation conditions improve.

* Abridged from a chapter of "Medicine v. Invasion," by G. B. Shirlaw and Clifford Troke, shortly to be published by Messrs. Secker and Warburg.

While planning coöperation with the civil-defence authorities the Home Guard M.O. must aim at a fair level of medical self-sufficiency in units under his care. While in the large underground aid-post there will almost certainly be an adequate number of A.R.P. first-aiders, in the smaller H.G. regimental aid-posts there will only rarely be such assistance available. It is essential, therefore, that at least two men in every detachment shall have reached a dependable standard of first-aid. So far the medical supplies issued to the H.G. have been on a very small scale, but as the supply position improves proper battalion stores will obviously be accumulated, for there seems no valid reason why the level of equipment should in medical respects fall below that of the regulars. Both sets of men run the same risks.

The M.O. should have under him at least a sergeant and corporal for the control of a sufficient number of stretcher bearers. These men must be trained not only in first-aid from a strictly common-sense military point of view, but also in the technique of casualty collection under fire. In the best of the men this will be instinctive, but a good deal can be taught. Collection of wounded is not always possible and must never be attempted when likely to restrict the fire of a strong point under pressure. Normally, men who are injured in an isolated pill-box will have to remain till the whole situation is dealt with and the enemy are either rounded up or in full retreat. When, however, a pill-box abuts on buildings whose approaches are commanded by other strong points and entry to which can be made without undue hindrance to supporting zones of fire, it should be possible to get the wounded clear without disproportionate danger. It may even be possible to move up an ambulance under the shelter of a friendly wall.

The town casualty service depends finally on the hospitals. These are difficult to defend, they have large expanses of glass, few strong points and numerous approaches; while the presence of wounded within them adds greatly to the defenders' problems. Once they are isolated and are being defended from inside their usefulness to the main forces in the town is ended—they can receive further casualties only from the ranks of their defenders. The aim must be to keep them as part of the main defensive system within the town, thinking of them not as single buildings but as centres with communication lines.

From any defended point the lines of evacuation run to hospital or aid-post. It is essential to have more than one line. In trench warfare it is known with certainty from which direction the attack will come, but in the type of conflict which we shall be facing this can rarely be known. An ambulance going to a single pre-arranged collection point in the rear of a strongly defended post may find that it is from the rear that the attack has come and blunder straight into the attackers. Each fortified post or system should therefore have several known collection points—A, B, C, and D they might be called—so arranged that casualties can always be sent to the point which is farthest from the main attacking thrust. In giving instructions to the ambulance the A.R.P. Control Centre will not say "collect casualties from West Station." Directions given will be more precise. "West Station attacked from the north along main line. Remove casualties from collection point B." Reference to the appropriate map shows that point B is a cellar in a goods yard to the south of the station.

Such improvisations as these will spring to the mind of any M.O. who studies his job in advance; but they are the bravura passages. The main body of the advance work will consist in the laborious collection of information from a dozen different sources; the creation of smooth liaison with military and civil authorities who may display inertia if not displeasure when confronted by Home Guard keenness; and the training in rational first-aid of well-meaning men who at their worst will appear to the doctor as homicidal maniacs. Perseverance and clear thinking will solve all problems of information, liaison and instruction. The Home Guard M.O. must start out on his job determined to obtain first a clear-cut picture of the civilian and military administration of his area; secondly, plain undertakings from the authorities concerned as to what help will be available to him and under what conditions; lastly, a level of casualty drill on the part of the men in his charge which will ensure that no life is lost through ignorance or inefficiency.

RURAL AREAS

The task of the Home Guard M.O. in the prosperous country district, where villages are numerous and there are a few fair-sized towns, involves certain basic difficulties. These are distance, the scarcity of doctors, and the absence of proper A.R.P. sense in the average village. A village which in the terror raids of last autumn, and in the dislocation raids of the present time, has meant nothing in the Nazi scheme, may become a target of the utmost importance in an invasion. Since the defence does not know the invasion plan the pivotal nature of a particular place may not be obvious till the attack has begun, so a village hitherto undisturbed may find itself suddenly a target for dive-bombers and with no anti-aircraft batteries available. The attack may have no military objective in the strict sense of that term, and may be intended only to set the villagers in flight, causing them to block the roads. The first task of the Home Guard M.O. in the well-peopled countryside is to show villagers their importance in the scheme of things.

The A.R.P. service in a large village is usually no more than a first-aid point: a small room with a first-aid kit of about the same size and usefulness as the contents of the average pouch. The room may be a disused toolshed; the kit will vary in completeness. Its contents may have been drawn on in civil emergencies, not excluding veterinary surgery. On the other hand there may be found in a small village a level of intelligent preparation which would shame some towns. Rural aid-posts are a mixed bag. On them, however, the Home Guard must rely when casualties are incurred, and the first duty of the M.O. is to make a personal tour of inspection as tactfully as possible. It is unwise to depend on statistics in the files of the county medical officer unless you are sure of his quality. He may be a brilliant organiser, full of ideas for research and progressive treatments, or he may be a delightful old fellow who has taken a country job because it permits all the pleasures of retirement at a salary usually associated with the performance of useful work.

The Home Guard M.O. must next enrol as many nurses and doctors as he can muster. From these he must exact the promise that in case of trouble each of them will proceed to a given point prepared to meet a certain need. As this process of enrolment goes on it will almost certainly become plain that the supply of doctors and nurses is inadequate and that a complete fusion of A.R.P. with the Home Guard is needed from the medical point of view. The main difficulty which will be encountered in any scheme of fusion is control. Though we are all loath to resign authority, it is essential that no doubt shall exist in a military organisation as to who has ultimate control. The pitfalls of dual command are obvious and must be avoided from the start. If the county medical officer in conjunction with the local M.O.H. is willing and able to undertake the medical organisation of the Home Guard the question of twofold authority will not arise. Once an understanding of this nature is arrived at the path to efficiency is smoothed. The county may be a convenient area from which to plan; on the other hand, some other regional system may be preferable; but whatever area is taken it must be divided into sectors and medical control for a time of emergency established in each.

Lines of casualty evacuation corresponding to various possible situations will have to be laid down. Evacuation falls under one of three heads: (*a*) siege, (*b*) local, (*c*) total. In other words, if a village is attacked casualties may be carried (*a*) into it, (*b*) to a nearby village, or (*c*) out of the whole area. The phrase "total evacuation" is here used only in relation to the wounded, and does not mean that everyone is cleared out of an area. Total evacuation is an ideal policy, and like most ideals has little hope of being realised. In any event it will usually have to be postponed till the scope of the whole conflict is apparent. In dealing with siege as distinct from local evacuation, however, various interesting questions are raised immediately. The advantages of siege evacuation are that it is rapid and that the conditions likely to be met with are known. The disadvantages, which are equally obvious, may be summarised as follows.

1. The presence of wounded in a surrounded post hampers the defenders and may lower morale. But it must be pointed out that if a post is surrounded the wounded are bound to remain in it, and that men may fight all the better knowing they are protecting their injured comrades.

2. The point when surrounded may be bombed from the air. This means additional risk for the wounded. But where in total war will they be immune from such risks?

3. Skilled medical and nursing help, by remaining in an endangered position, risk capture along with the wounded, and cannot well be spared. This risk can in part be provided against by issuing clear instructions to skilled staff as to what their duties are. A doctor must always remember that his responsibilities are to the many rather than to the few, and he must be prepared to risk the charge of cowardice from the uninformed if quick retreat means the continuance of his service and courageous delay may involve its total loss.

Local evacuation has similar advantages and dangers. The transport situation may be difficult, the roads long and bad; there is always in parachute warfare the possibility of enemy being encountered in most unlikely places. To offset these considerations is the fact that the underlying principle of good casualty work is always to get the wounded away as rapidly as possible. Further, the possible immobilisation of medical staff with valuable equipment is a risk which must be avoided as far as human foresight can provide against it. The problem will be modified by local conditions; but when the enemy attack comes from one definite direction and the defence is falling back, casualties should be evacuated to the nearest village behind the defensive positions. A state of siege may, after all, be avoided, and even if it is not there is no certainty of capture. Relief should always be speedy; reinforcement is far easier for the defenders than for the invading enemy. Even if wounded and medical staff are captured they are not a certain loss. Swift recapture of the position is possible, even likely.

THE VILLAGE AID-POINT

Accessibility, safe structure and good equipment should be aimed at in a village first-aid point. Stretchers should be provided, with efficient stretcher-bearers, and a reasonable number of vehicles should be earmarked for the collection of wounded. The medical man assigned to the post should be thoroughly acquainted with its staff and equipment. Rehearsal is the best means of ensuring smooth working, but it is useless if not thorough, since faults do not appear and false confidence is bred. The post should be centrally placed to enable it to be easily defended. A centre may be mathematical, geographical, or strategic; the village F.A.P. need not necessarily be at any one of these. The strong points on the village perimeter will probably be bombed; so will the social focus of the village as observed from the air, for it will be here that the headquarters will be presumed to lie. The F.A.P. can best be placed in the intervening region provided it is sufficiently central to be in comparatively little danger of capture. A military casualty clearing station must be sited not only for ease of collection of cases but also with a view to ease of clearance. Evacuation routes must not, however, be those of great military importance. In the first place, every convoy of wounded occupies space valuable to advancing reserves; in the second, any main route or road junction is a certain target for the bomber and the fighter, suddenly aware of a chance for machine-gun attack. The leafy lanes, sometimes sunken, which are found in so many parts of England, will often afford an ideal means of bringing ambulances well up to the zone of battle. The needs of aid-post, regimental station, field-ambulance centre, and casualty clearing hospital are alike in this—each demands strategic placing in relation to road, rail or river, sound camouflage, adequate protection, and a high degree of mobility. With regard to camouflage it should be observed that hospitals, however well concealed their buildings or tents may be, will inevitably reveal their position if all their washing is hung to dry in the sun, or if a stream of ambulances, one after the other, raise characteristic dust-clouds along a road. Nurses will do well to conceal their white uniforms when sent out on mobile hospital work. They can be seen for miles on a clear day, and should be covered by a khaki macintosh.

Unless the number of wounded is large, the trained staff should not leave the village; but if casualties are considerable at some distance it may be urgently desirable to send reinforcements to the place. For this purpose small well-protected convoys must be formed, consisting in their simplest form of a car and an ambulance. In this way additional collection bases may be set up where needed, and the cases classified as urgent or non-urgent on the spot. The disposal of urgent cases depends on what hospital facilities are available. The nearest town to possess adequate surgical necessities may be situated too far away, in which case surgical teams must be summoned to meet the serious cases at a convenient rendezvous. Communications are likely to be a serious problem. The telephone may not function reliably, but when it fails cyclists can be called upon. The wardens' service will have worked out systems of communication and these should be, in general, available to the Home Guard.

Though each aid-post should have means of becoming mobile in a special emergency, the central area, under the orders of a chief medical officer, should endeavour to have several mobile units in reserve. These should be sent forward if a serious casualty situation appeared likely to develop on any section of the front, and they should aim at forming either an advance dressing post or a main treatment and classification post as required. Camouflage is important for such purposes. It is no use the Home Guard becoming expert at concealing their whereabouts if their ambulance units are to betray them. Training must be thorough, and if skilled tuition is not readily forthcoming a good officer must get what literature he can and work things out for himself. If a few simple textbook principles of a technical nature (and so not likely to be arrived at by common sense alone) are firmly grasped, it is amazing what the comparatively unskilled unit can accomplish.

Speedy evacuation must include practice in the quick getaway under conditions of surprise attack. An exercise in which this is accomplished under cover of a defensive action by a special H.G. force should prove of great interest to members of the section. Large-scale tests of this type are so difficult to organise that field tests tend in some quarters to be neglected. This is a mistake; an extensive exercise of a volunteer force is awkward, for men have their livings to earn and the time they can spare is limited, but much can be learned by a series of small affairs. Their subsequent dovetailing in theory will provide excellent lecture material.

Difficult though A.R.P. work may be under blitz conditions, it is simplicity itself compared with the casualty problems which arise when the Home Guard are pictured at grips with invaders. In air-raid casualty work the medical officer's responsibility is largely towards individuals. By his good work they are saved; by his errors or neglect they die. But faced with the task of sustaining morale in small groups of men who may be forced to fight to the death against considerable odds, the M.O. may feel that the responsibility is beyond his powers. Not individual but national survival is threatened. He may well pray for complete military intervention to relieve him from the burden of decisions fraught with danger. If there is one quality, however, which by the nature of his position the country doctor must possess, it is self-reliance. No-one who knows this body of men will doubt their steadfastness in time of trial.

AGE-LIMIT FOR OFFICERS OF IRISH LOCAL AUTHORITIES

By a bill which lately passed both houses of the Oireachtas a radical change has been made in the tenure of employment of all officers of Irish local authorities, including of course the medical officers, generally known as dispensary doctors, who make up nearly a third of the entire medical profession in Ireland. Hitherto, these officers, when once appointed, held office for life and could only be removed for misconduct or because they had become incapable of performing their duties by reason of infirmity of mind or body or because their office had been abolished. By the new legislation the minister for local government and public health will be empowered to declare an age of retirement for each class of local officer, which will become effective six months

after it is made. The minister will have power to fix different ages for different classes of officer.

The bill passed through the Dáil without criticism of this point, but an amendment was moved in the Senate that the section should not apply to part-time officers whose terms of appointment included no compulsory retiring age. It was pointed out that the clause interfered with an existing contract between the medical officers on the one hand and the local authorities and the department of local government on the other; that the expectation of a tenure of office uncontrolled by an artificial age-limit attracted candidates to the service; and that adequate powers were already in the hands of the minister to compel the retirement of an officer rendered by age incapable of performing his duties. The amendment was rejected by the minister, who maintained that a fixed retiring age was necessary, since at present he found difficulty in securing the retirement of elderly officers. He emphasised that it would be open to him to fix different ages for different classes, and he expressed the opinion that 65 would be unsuitable. This admission was welcomed, for it was remembered that some five years ago the department had circularised local authorities advising them that 65 should be made a compulsory retiring age for all their officers. The circular was phrased so as to appear mandatory on the local authorities, and was acted upon in some instances. The Irish Medical Union, however, challenged the circular on legal grounds, and the department had to admit that it had no powers in the matter and that the circular was merely advisory. It had been feared that if an age-limit was fixed it would be at 65.

In England Now

A Running Commentary by Peripatetic Correspondents

I AM concerned about the V campaign. Up to date it has reminded me of an Oxford don in a writing-on-the-lavatory-wall competition. I don't want to be censorious, but a Government, eighty per cent. of whom were guilty of the gross psychological error of appeasement, the zoological equivalent of which is trying to stop a pack of wolves with a bag of monkey nuts, mustn't be offended if we professional psychologists offer advice. I feel that Quentin Reynolds and "Cassandra" were on the right tack when they held their opponents up to scorn on account of their Christian and surnames. At first it may seem rather strange that Hitler, who is responsible for millions of blasted lives, a lake of children's blood, sorrow that will rake for fifty years, a thousand tides of terror, a holocaust of youth, a pyre of pain, should be jeered at for having a Christian name that he couldn't help, and for changing his surname from Schickelgruber to Hitler, which seems rather sensible. But that's not the point. The point is that war is a reversion to a twelve-year-old state and this is the authentic twelve-year-old touch. Now, Colonel John Bull Britain (oh how withering!), let's see whom you have on your committee. What, Lady Pouncey? O tut! Lord Agar? Pshaw! I'll have to choose them for you. You, Smith minor, you who organised your class to stare at your new form-master's fly-buttons until he blushed, I know you got six of the best for it, but your country needs your genius now, my boy. Come along. And that girl of G. A. Birmingham's who worked in a small Irish hotel and wanted to get rid of the guests, so all their food tasted of paraffin, even the boiled eggs which she contrived with a hat-pin. You need girls like that, Colonel B. Wire for her at once at Ballyshannon. She'll command our Ninth (Cranial) Army Corps. Now for the Eighth. You, Jones minimus, who ever drum on desks, whistle just out of tune, kick tin cans, tattoo on iron railings, specialise in slate-pencil noises, make succulent sounds which I am creditably informed by the bootboy are technically known as "raspberries," you're the man for this. Do you know the dog whistle, J. minimus, which will bring a dog to heel, but is inaudible to man? Well, we'll show you how to make one which will keep the Hun's ear on edge. They with their dive bombers and whistling bombs have used that pathway down the chorda tympani to rack the parasympathetic, so will we. I need not remind you, General Jones, that it is the ragged, irregular, very highly or very lowly pitched, unmetrical noises that are particularly trying, especially at bedtime and very early morning. And you, young Robinson, who got soundly beaten for making mercaptan in the laboratory, we humbly apologise, we need your enterprise now. You shall command our First Army Corps. And you, all you other little swine, who carry caterpillars in match-boxes and keep mice in your desks, we need you too. We'll give you grisly things to do with tænia eggs and jolly acari. We'll train an army in the mystery of making "Russian fleas"—finely chopped horsehair, steeped in an irritant, which tactfully placed on chairs will work through Prussian breeches and even irritate barbarian skin. What's that you say, Colonel B.? Childish and beastly. Yes, I know, but then war is a very childish business in spite of its mechanisation, and when it comes to man being dominated by brutes, then unarmed man seeks his ancient weapons. Onward pin-prick soldiers.

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The disruption of family life leaving me with more evening leisure than was pleasant, I decided that it could be used most profitably for the war effort in first-aid instruction. So for the past two years I have done a good deal of lecturing for the St. John and other bodies, and have spent even more time in examining first-aid candidates. In the course of all these examinations of both elementary and advanced first-aiders I have not met a single candidate who had any conception of what shock was. They all knew the treatment, nearly all knew the signs and symptoms (or most of these) but they had no real understanding of why they occurred. Nor was there a single candidate who knew that shock might make its first appearance eight hours after an injury. One should not, of course, expect detailed and scientific knowledge in first-aiders, but I have always found classes respond much better when they are told Why as well as How. I devised the following model to link the symptoms of shock together, and to correlate them with hæmorrhage.

"Let us imagine that this building is heated by a closed hot-water system which has a fire to heat the water, a pump to drive it round the pipes and a cistern which is normally half full. Now the room gets cold and we go to find out why. The fire may have died down, the pump may be faulty, the pipes may be leaking, or the cistern may have filled up completely. With the exception of the first case the volume of circulating water is reduced and so less heat is carried round the building. Now let us relate this to the body. The fire corresponds to the chemical processes of the human organism and these may be damped down by disease and long exposure to cold and strain. The pump is the heart, and when it fails we have collapse (sometimes associated with the failure of the 'fires'). If the pipes have burst and water is pouring down the outside of the building, that is the same as external hæmorrhage—you can see the bleeding without difficulty. But the pipes may have burst in such a way that the water is running into the basement, and is not easily spotted because none appears on the outside. This is the same as internal hæmorrhage. Finally, the whole system of pipes may become porous so that water escapes in small amounts all along their course and at the same time the cistern fills up completely. This is the picture of shock. In this condition, for reasons which are not well understood, the blood-vessels allow some of the blood fluid to pass through the walls, thus reducing the amount of circulating blood; in addition, blood tends to stagnate in the liver, spleen and large abdominal veins. (This is a rather controversial point but the lecture is for first-aiders, not experimental pathologists.) The essential thing is that the volume of the circulating blood is reduced.

"Now I have already told you that one of the chief functions of the blood is to carry oxygen round the body. If the amount of oxygen is reduced every organ will be affected. The brain does not work so well, the patient therefore becomes anxious, confused, stuporous and finally comatose. The muscles do not get enough oxygen so that they cannot contract so well, and the patient becomes weak. The lungs try to make up the deficiency and breathing becomes laboured. The heart receives messages to counteract the trouble, and beats more rapidly in an attempt to drive the smaller amount of blood round the body quicker. So the pulse-rate goes up. But the heart does not have enough time to fill, and its muscle is not receiving sufficient oxygen so the beats are

weaker. The normal amount of blood is not flowing through the skin, and what there is is darker in colour, so the patient assumes a leaden pallor. As the amount of oxygen carried round the body is reduced so the intensity of chemical actions is lessened and the body temperature falls. All these things occur in external and internal hæmorrhage and collapse and shock. From this you can see why we treat these cases as we do. You will see also that if you remember the fundamental fact that the blood-volume is reduced in these conditions, then you can easily work out for yourselves how all the signs and symptoms are produced."

This model will perhaps not bear searching analysis from the physiological or pathological viewpoints. It does, however, pass the pragmatic test, and satisfies the student's curiosity.

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The surgical team that is officially termed the "Facio-maxillary unit" was recently mentioned in a report. The proof came back from the printer with "Facio-maxmillery unit."

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Most of us, I hope, would agree with your peripatetic philosopher when he says that our national system of education requires a complete overhaul after the war. It is only at the point where we must decide in what ways we propose to alter it that our views begin to diverge. Despite the now thoroughly stale gibes at the public schools, I for one think that, with all their faults, they represent the best kind of education we have to offer. We have been told ad nauseam that the competitive type of education they provide, with its accent on athleticism, makes for war-mindedness, but does it? Some nations with nothing approaching a public-school system of education have done a good deal of fighting in their time, and we ourselves had a war or two before the public schools really got into their stride. Can the few public schools then extant be held responsible for the doubtless regrettable, if highly successful, pugnacity of the Elizabethans? I doubt it. The cry that public schools breed class-consciousness is, of course, only half true; the real cause is the dual system of education which engenders a feeling of inferiority in those who consider that they have been given something less than the best available. Indeed the most socially uncomfortable and class-conscious persons one meets are those who have been educated at secondary schools and subsequently graduated at a university. For some reason they are apt to be perpetually on guard and to view the lightest and most innocent conversational opening with suspicion.

By all means let us have a single system of education equally available to all children irrespective of the size of the parental purse, but let it be built on a high and expanding level of excellence. If we contrived to make our improved and ever-improving public schools really public we should have done something worth while. Turning to medical education it seems reasonably certain that, come what may, something akin to the present general practitioner (only better) will be required in considerable numbers, and I would suggest that the present curriculum be drastically revised to meet the basic needs of general practice. First, I would have students taught to read, write and speak their own and at least one other language before embarking on the study of any technical aspect of medicine. All pre-clinical studies might, I think, with advantage be curtailed; it is not in the laboratory or the lecture theatre but in the wards and the outpatient departments that the student will learn most of the things that will be useful to his future patients. For the embryo general practitioner to stand for hours in the theatre watching major operations that he will never be called on to perform is a pure waste of his time. On the other hand, let him administer all the anæsthetics he can, do all the minor surgery he can, see and learn to diagnose all the surgical emergencies he can, see all the acute and chronic medical cases he can and learn far more pharmacology and therapeutics than he does at present. I would have him taught prognosis by an experienced general practitioner and he should do a course of practical domiciliary nursing. As for midwifery I would allow none to practise it until he had had at least six months' postgraduate experience at a maternity hospital, or, better still, assisted at, say, 50 cases delivered in their own homes by experienced general practitioners. Lastly, before letting him loose on the public I would have him either travel round the world as a ship's surgeon or else tour that dreadful Europe, meeting and mixing with all sorts and so overcoming his prejudices, for the general practitioner must look on his patients as individuals, unique phenomena in nature, not to be liked or disliked because they fit in, or fail to fit in, with his own peculiar code of ethics or standards of behaviour.

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Recently I renewed acquaintance with Ern and Jim, those skilled agriculturists, whose roots are so deeply embedded in the soil that they pay no heed to "this trifle, war." Being pressed by a humane master to take a well-earned holiday on full pay they consented but with considerable reluctance. Ern went first, was thoroughly bored and miserable and returned to work before his leave had expired. Jim, no less unskilled in the art of leisure so beloved of intellectuals, gravitated to the pub and solemnly filled himself to the brim and overflowing with cider. The local policeman kindly gave him a lift home in a car, and on being helped out Jim returned thanks by saying: "You'm ony a p'liceman and got no manner o' right on our place, git ort!" The menacing gesture that accompanied these powerful words would, I understand, have been more impressive had Jim been less whistled and so able to stand poised instead of staggering in all directions. Next day I met him full of alcoholic remorse. He had sneaked back to the farm while the rest of them were dung-spreading and was furtively carrying a bucket of water to the goats and "giving an eye"—as he described it—to the sheep. "If you're supposed to be on holiday, Jim," I protested, "why do you come back to work?" He shifted uneasily and shook his head. "Allus plenty to do on a farm, doctor," he said.

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Adventures, like misfortunes, seldom come singly. One afternoon I was summoned by a dentist to administer gas to an immense and powerful man who confessed that he was nervous of anæsthetics. While he was going under he began to box and from my point of vantage behind the stumps it was pretty to watch his footwork. He kept putting out a nice straight left at the nurse who ducked and side-stepped neatly and at intervals he swung a wicked right dangerously close to the dentist's jaw. We got him down at last and having pinioned his arms securely with a couple of towels the dentist was able to draw the offending teeth. "How many rounds did I go?" was the patient's first question on regaining consciousness. "The last time I went to a dentist," he added dreamily, "I knocked the poor chap out." It turned out that he had been a prize-fighter and has since become a theological student: an instance of muscular christianity. That same evening I was called to see a cow. Jim and Ern met me with long faces. "Er's dyin' on 'er feet," said the pessimistic Jim, "and there's nought as you can do for 'er." Where cows are concerned we have only two diagnoses—if they are "blawed" we call it "the information," and if they are breathing fast 'tis the pewmonia. This one was certainly very ill with pyrexia, a staring coat and tachypnœa, so we diagnosed pewmonia. I dissolved 10 tablets of sulphapyridine and injected the solution into the buttock. Much to everyone's surprise she was still alive next day so we injected some more sulphapyridine. Next morning she was obviously moribund and had to be shot. It was just bad luck that the postmortem carried out at the local abattoir revealed that she had swallowed a piece of wire which had touched her heart. As her owner observed, we had the satisfaction of knowing that we had done all that modern science could do and her relations could have no cause for complaint.

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When I passed the kitchen door on my way to breakfast this morning a gloomy voice was remarking, "One breast-fed baby, remember, dies for every five fed in other ways." Shades of William Farr! Think of the feelings of a mother who has just had to give up feeding her baby on the breast for some very good reason when handed this kind of remark sandwiched between recipes for cooking carrots. Of course, she might ring up the B.B.C. and ask how many breast-fed and how many bottle-fed babies there are, but if she isn't a born fallacy-spotter she may just brood.

Letters to the Editor

STANDARDISATION OF DIPHTHERIA PROPHYLACTICS

SIR,—Your leader of Aug. 9 is opportune, but I fear it does little to achieve what it very properly advocates—a standard method and technique. Let us be clear on this subject. The following statements are well documented, as anyone may verify by consulting the literature, which, incidentally, has been reviewed in my monograph on the subject.

1. The Schick test is for practical purposes a sound and certainly the most convenient test of susceptibility to clinical diphtheria. The Schick-negative rate produced by any antigen or method is a good reflexion of the efficacy of that method but it is impossible to guarantee that any one Schick-negative child will not take diphtheria. Furthermore, no small experience is necessary for the accurate performance and interpretation of Schick tests.

2. The antigenic results produced by different preparations have not been consistent. This is due to three main causes—differences in the original immunity and potential immunisability of a community, and in the antigenicity of the prophylactics used. Two small well-spaced injections of a reputable brand of A.P.T. have given a constant Schick-negative rate of nearly 98%. I am unaware of any published work in this country or America where two properly spaced injections of A.P.T. have given a low Schick-negative rate. Undoubtedly the peculiar properties inherent in A.P.T. tend to counteract any possible variation in antigenic power.

3. If propaganda is to be effective it is essential that the parents and the child be caused as little inconvenience as is possible; every effort should be made to limit the number of injections necessary.

These then are the facts. How are they to be applied? Few will deny that A.P.T. is the preparation of choice for general purposes, for it is more effective in two doses than the others are in three. But in using A.P.T., as any other preparation, it is necessary to guard against possible variation in antigenicity and this can be done in two ways—by Schick testing all cases after treatment; or by studying the effect of increased dosage.

The Schick-testing of all cases is inadvisable for the following reasons:

The test is not infallible and so in individual cases one cannot guarantee immunity. Experience in performance and interpretation of the test is necessary. At the present time large numbers of doctors have been called on to carry out immunisation who through no fault of their own do not possess this experience. It would be as unreasonable to expect inexperienced people to refract a mixed astigmatism or to remove an appendix as to carry out a Schick test.

A Schick test means two extra visits for parent and doctor; this will seriously hamper the work of effective propaganda. It will cause extra expenditure of time and material and no guarantee of absolute immunity can even then be given.

After A.P.T. if further measures are thought necessary it is more logical to give a third injection of prophylactic.

As the routine use of the Schick test is untenable attention must be given to dosage and technique in administration of the antigen. There are sound reasons for thinking that the dosage given below will give a very high degree of protection and will allow for possible variations in antigenic power due to environmental conditions or due to different batches of A.P.T. The method is as follows:

In children under eight years 0·5 c.cm. of A.P.T. intramuscularly into the extensor aspect of the left arm. Interval at least a month and a similar dose repeated into the right arm.

In children over eight, 0·1–0·25 c.cm. of A.P.T. intramuscularly into extensor aspect of left arm. Interval at least a month. If no reaction to the first dose, 0·5 c.cm. intramuscularly into extensor aspect of right arm.

No final Schick test to be performed.

There remains the possibility that a very poor batch of A.P.T. may inadvertently be issued for general use, an unfortunate happening that some think has taken place recently. How can this be prevented? The methods of manufacture, reagents used etc., should be laid down and manufacturers should adhere strictly to the procedure. Some of the provisions of the Therapeutic Substances Act may require revision or qualification. In addition, arrangements should be made for any new batch of A.P.T. to be tested on a small group of children. This should be entrusted to a worker with wide experience of Schick testing and should be carried out in an area where the diphtheria incidence is fairly constant and on children of the same age and social status. (This, of course, is a very different matter from general routine Schick testing of all cases.)

These precautions would mean a preparation as nearly standardised as possible and tested before issue. The larger dose would almost certainly suffice to counteract any variations in antigenic effect resulting from local environmental conditions (low latent immunisation and/or diminished immunisability). Your leader exhorts the Government—and this exhortation will be loudly echoed—to lay down a standard. I submit that the above is the way to go about it.

Croydon. JOHN TUDOR LEWIS.

CARE FOR HOME GUARD CASUALTIES

SIR,—Intimate personal experience of the great Jamaican earthquake, the last war, and fierce communal riots in Bombay, Calcutta and Johannesburg, where all medical communication by road or telephone was cut off for days, impels me, as the medical officer of a Home Guard battalion, to elaborate and criticise the leading article of Aug. 16.

When, and if, the balloon does go up, it must be fully appreciated that the Home Guard at "action stations" cannot depend upon the ready and efficient medical aid of A.R.P. posts, for these are immobile and likely to be tried to the utmost by civilian incidents in the neighbourhood. Moreover, it may not be even possible to reach or communicate with this organisation until after dark or until the roads and skies are clear. Therefore, it is imperative that every company of a mobile or static battalion should be capable of dealing with its own wounded, burned or gassed men to the extent of 25% of its full strength. At present, seeing that there is no provision whatever of medical (drug) equipment, it is not difficult to visualise the ghastly medical mess and devastating loss of morale that must result if the Home Guard were engaged in countering an invasion, say, next week. Surely something should be done quickly to rectify this lamentable state of affairs. Is it fair or reasonable to suggest that M.O.'s of battalions (often over 2000 strong) should go round with cap and bell asking for donations to purchase urgent medical necessities that it is the duty of the state to provide? Are we in the stress of battle to expect company officers or N.C.O.'s (for there is only one M.O. per scattered battalion) to depend (in answer to a scrawled demand) on the limited generosity and critical attitude of some capricious O.C. of an A.R.P. post, an E.M.S. unit, or a military hospital, who, jealous of his own meagre supplies would probably require the certificated quadruplicated authority of the A.D.M.S. or Ministry of Health before parting? No sir, let us have done with charity and muddling through after fifteen months of growing pains.

It is my opinion that every company of every battalion should be provided with the minimum requirements, in easy portable form, for dealing with the risks of pain, sepsis, burns, tetanus and fractures. The outfit, in addition to the queer collection of inadequate splints and bandages you refer to, would be in charge of the N.C.O. of a stretcher party who would be responsible to the company officer and/or medical officer.

Pain would require morphia in tablet form for oral use and ampoules for injection, if a syringe can be obtained.

Sepsis. Sulphanilamide in 5 gramme powders in Cellophane packets or 0·5 gramme tablets should be liberally stocked. The former for use in wounds, the latter by mouth. Indeed sulphanilamide would be a fitting addition to every new first field dressing.

Burns.—Vaselined gauze sterile in tins, or tannic or acriflavine jelly, can be readily carried in screw-top metal jars.

Tetanus.—In the event of fighting in this country, it is more than probable that the incidence of tetanus will be high. Therefore, as immediate evacuation is unlikely, antitetanic serum in ampoules or rubber-topped bottles must be available, together with a syringe.

Fractures.—In every company there are men who have done a first-aid course or obtained a certificate from the St. John

Brigade. It should not be difficult to teach these capable men the principles of plaster-of-paris slabs or bandaging, thus conserving limbs and maybe lives; for we must all visualise conditions where it may be hours, and perhaps days, before casualties can be safely and properly evacuated.

Although I have not touched on anti-gas equipment, I think you will agree that the supply of the suggested equipment to every company that may be working independently is urgently necessary if the medical department is to escape deservedly caustic criticism. Stretcher bearers are not only beasts of burden—indeed, they demand that they be given the means, now denied them, of applying the knowledge they have acquired in their classes.

I have calculated that the weight of a canvas-covered three-ply container, 18 in. by 18 in. by 8 in., fully stocked as above, including plaster-of-paris, for 25% of a company, would be about 14 lb.

Harley Street, W.1. V. B. GREEN-ARMYTAGE.

VITAL STATISTICS WANTED

SIR,—No doubt your readers will have noted that a few weeks ago in reply to a question in the House of Commons, the Minister of Health gave the number of deaths from tuberculosis in England and Wales during the years 1939 and 1940: they will also remember how some weeks before that the Minister was reminded that there have been published no health statistics for these countries since those of 1938 and how he promised to try to make public a bare summary of the figures at some future date. It may well be that there are sufficient reasons for this reticence, but it is a source of speculation and concern to those of us who are interested for we cannot help thinking how differently this matter is treated in Scotland. For that country, Sir, the public-health statistics are available to us in summarised form quarterly with an analytical introduction to the report at the end of the fourth quarter. This is admirable, but why is it not done in England? Why do we have to wait for a question in the House before we can discover that there has been a 7·5% rise in the tuberculosis mortality? It is in these particular figures that our interest lies, but statisticians and other workers interested in social health are wondering why the vital statistics and reports which form much of the raw material of their work are not made available, for without knowledge of the facts preventive action must be delayed.

RICHARD M. TITMUSS.
Edgware. A. S. HALL.

CALCIUM AND PHOSPHORUS STUDIES IN NORMAL PEOPLE

SIR,—Dr. Robertson's paper of July 26 on this subject should be examined in detail, for our calcium requirements are much in the public mind.

Calcium minimum.—He found, as we did, that there is a "restricted" output under low calcium intake. This suggests that some kind of conserving mechanism comes into action under a low intake. Evidently the minimum figures in the various experiments depend to an important extent upon the amount of calcium the subject is in the habit of taking. The real calcium minima are unknown and obviously lower than those given by the various investigators.

Optimum calcium intake.—I take it that by these figures Robertson means the calcium intake which completely saturates the subject with that substance (plus a quantity for marginal safety), so that he cannot absorb any more of it. The question now arises: What is the calcium level in the tissues of the experimental subject under an intake which just covers minimal requirement and a maximal (optimal) intake? Under the latter condition the reservoirs are full. We were able to prove that the tissue calcium, too, in such circumstances is higher than under the minimal intake. The crux of the whole question is, which of the two conditions is the more desirable? "Optimum requirement" in relation to what? Surely in relation to longevity or good health. The vital problem is whether a calcium intake which just meets requirements, or which fills the reservoirs to overflowing, or one which is between the two points, is the ideal. No data are available to judge which is the best. Robertson's figure of optimal requirement is purely arbitrary—not supported by any evidence whatever. Only long clinical observation can show which is the ideal. We are confronted with a similar problem in regard to fat reservoirs. Clinical experience has taught us that the average expectation of life of those who fill those reservoirs to full capacity is much below that of those who consume only sufficient to cover their needs. Robertson does not realise that the calcium level in the tissues is different under a maximal (optimal) from that under a minimal intake. He asserts that no harm can accrue under a large calcium intake since the surplus would leave the body via the fæces. (This is not quite true: part of the surplus is excreted by the kidney.) The tissues contain more calcium under a large intake. Whatever the action of calcium is, this obviously must be more pronounced under a high than under a low intake. According to the textbooks, calcium contracts the vessels and raises the blood-pressure. According to Jacoby (*Ther. d. Gegenw.* 1916, **57**, 161) calcium "thickens" the kidney filter and makes the performance of its function more difficult. We found that the intravenous injection of 2 c.cm. of a 10% solution of Collosol Calcium (Harris and Levin, *J. Physiol.* 1937, **89**, 153) definitely alters the character of the electrocardiogram; and we also drew attention to the increase of the work of the kidney under a larger calcium intake. There is also a considerable amount of literature on the subject, including positive feeding experiments. Clearly the assertion of Robertson that a large calcium intake can do no harm is quite untenable. The requirement of calcium cannot be determined by experimental methods. Clinically it is quite impossible for people to remain in a permanently negative calcium balance, without giving rise to manifestations. It is strange that 15–20 million people should be suffering from a calcium insufficiency and not exhibit any signs of it. The very rare condition of osteoporosis is now considered to be due to vitamin-D insufficiency.

In our paper on calcium we did not refer to retention of the substance in the aged; I only mentioned it in a letter, based on an entirely different set of experiments. We found retention of protein in the middle-aged, and we also found that wherever there was retention of protein, calcium too was retained ("High Blood Pressure," London). The reason is simply that part of the calcium is bound to the protein. Robertson denies that there is retention of calcium in the middle-aged on the strength of figures given in table VI of his paper. Now we pointed out in our paper that under a positive balance saturation must ultimately be reached, after which further absorption becomes impossible. Obviously in the fully saturated cases the middle-aged cannot react differently from the young. To demonstrate his point the subjects of Robertson's table should have been kept in a calcium-unsaturated state. As his figures stand now they are irrelevant to the question of calcium retention in the aged.

Why should Robertson think that as large a calcium intake as the body can possibly absorb, plus a margin of safety, makes for optimum health?

Liverpool. I. HARRIS.

PHARMACY AND MEDICINES ACT

SIR,—The concession in the Pharmacy and Medicines Act which perhaps attracted most attention, and is regarded as the most satisfactory change in the law, is the clause requiring disclosure of composition of medicines. Obviously its value depends on how far it fulfils its principal purpose—that the public should be fully informed of the nature of the medicines sold to them. I submit that the two proposals of clause 6 provide safeguards likely to be illusory. The reproduction of the accepted scientific name on the container has been widely adopted by the patent-medicine trade, which has not been slow in perceiving that this requirement gives the general public no information which they can appreciate. Thus, a proprietary brand of aspirin declares that its product is "pure acetylsalicylic acid," a description which fails to inform the public that the product is nothing else than aspirin, which can be bought under that name at a fraction of the cost of the proprietary product. The alternative afforded, namely the quotation of the description of the substance in the current edition of the B.P. or B.P.C., is equally ineffec-

tive. When it was pointed out that the general public would not be likely to possess copies of these technical publications, the Parliamentary Secretary made the astonishing statement that they could be consulted in local free libraries. How many such libraries would stock current editions of either of these expensive works, and would the average purchaser of patent medicines gain any knowledge from consultation of these highly technical treatises?

Probably one of the greatest abuses in the patent-medicine trade is the licence given to sell well-known drugs under fancy names. This abuse was commented on by the Select Committee of 1914, and among others they gave as an example phenolphthalein, which at that date was sold under no less than sixteen fancy names, and the select committee framed the recommendation No. 6 " that fancy names for recognised drugs be subject to regulation." I sought, in the committee stage, to add a clause carrying out this recommendation. It was opposed by two hon. members, one of whom very properly disclosed that he had a financial interest in the trade, and the other, a distinguished lawyer, admitted that " he had been advising some of the trade interests concerned in the arrangements which have resulted in the bill." Upon the minister declaring that the inclusion of this clause would upset agreements arrived at outside the House, the disturbance of which he strongly deprecated, I withdrew my amendment. The minister had declined during the debate to reveal the bodies which it was alleged had come to an agreement in this way, but in a subsequent answer to a question put by me, he gave the list (see *Lancet*, Aug. 16, 1941, p. 203). For a bill which was to give consideration to the public-health implications of the patent-medicine trade, it is surely remarkable that no opportunity was afforded for the expression of opinion by medical bodies, who are chiefly concerned in the safeguarding of public health.

House of Commons. E. GRAHAM-LITTLE.

TREATMENT OF TROOPS AT CIVILIAN V.D. CLINICS

SIR,—Dr. H. H. White (Aug. 16) has called attention to one of the difficulties which often occurs in the treatment of Service V.D. cases at civilian clinics. The lack of coöperation has caused me much concern; the conditions of the last 10 months will, if they continue, result in a considerable proportion of inadequately treated cases. I hold a written statement that the civilian clinics will not be held responsible for bad results, but I cannot help feeling that the final situation will be reflected to our disadvantage unless better coöperation can be obtained. I have tried to make contact with defaulting cases and have been told that I misunderstood my responsibilities to the Army. If a patient fails to attend, I am to infer that he is attending elsewhere for his weekly injection. Men attending a week late have told me that they were not allowed off duty on the correct day and cases transferred to me have brought records showing long intervals in their treatment of syphilis. I suggest that when a man is transferred to another area, the M.O. of the civilian clinic which he has been attending and the M.O. of the clinic in the area to which he is transferred should be *immediately* informed. For, in taking on the cases at all, we have a duty to the man quite apart from our " responsibilities to the Army."

Often a new case attends with his " pro forma " incompletely filled up. In any case, every patient calls for individual consideration and the medical officer treating that patient should have a detailed record of previous treatment and of his reaction to that treatment. It is absurd to suggest that the civilian clinic is only asked to carry out a prescribed treatment, for the M.O. of the unit will usually have no special knowledge of V.D.—in point of fact, I cannot recall a single case referred to me for a prescribed injection. I cannot understand why the man should not be given his I. 1247 (if desirable, a duplicate I. 1247) to be carried to and from the clinic by him on each attendance; this method is effective with civilian cases and it would, if extended to Service cases, overcome most of the difficulties, including that of the man who is returned to his unit long before his records are forwarded from the military hospital. The real difficulty is, I think, that the civilian clinics are regarded by the Service authorities as outside their V.D. schemes but available for intermediate treatment as a convenience. This inadequate coöperation is apparent in the following example.

A soldier complaining of a discharge from the urethra was " incorrectly " sent to my clinic by his medical officer. I found gonococci in the smear, gave sulphathiazole and referred the case back to his medical officer. The man was, of course, sent to a military hospital and in due course returned to me for surveillance. I then found that, in spite of my report, the diagnosis " urethritis " had been made because gonococci were not found at the military hospital after his initial dose of Thiazamide.

Satisfactory results could be obtained by the utilisation of civilian clinics for the routine treatment of Service cases of venereal disease, but only if Form I. 1247 is made available and the transfer of cases is notified. Unless some coöperation is forthcoming medical officers of civilian clinics will not be to blame if they become tired of trying to maintain some standard of efficiency with Service cases.

Canterbury. DAVID ERSKINE.

PREMARITAL AND PRENATAL TESTS

SIR,—I agree with Dr. Violet Russell (July 26, p. 115) that there is really no reason why Wassermann tests should not form part of the routine examination of pregnant women at the antenatal clinics, and it is difficult to see why doctors should object to this procedure, particularly when the women have no objection. Premarital tests would cause difficulties in many cases, and might have a deterrent effect on the prenatal test; I doubt, too, whether a better result would be obtained if the mother's positive test was discovered before marriage. It would be interesting to know in Dr. Russell's cases how many women per 1000 showed a positive result. Colonel L. W. Harrison lately told us (*Lancet*, Aug. 2, p. 136) that in 1939 the number of cases of early syphilis dealt with for the first time at the civilian centres in England and Wales was 4986, a decrease of 45% since 1931, and less than a third of the number in 1920. He also showed that there was a decline in the role of syphilis in killing infants; their death-rate from this cause had fallen from 2·03 per 1000 in 1917 to 0·2 in 1939. My own experience at the infant-welfare centres during 28 years bears out Colonel Harrison's observations. I saw remarkably few cases which showed clinical signs of congenital syphilis. Cases of marasmus with snuffles and sore buttocks, which I was taught to regard as syphilitic in my student days, I referred to hospital for Wassermann tests, but in not a single case was the result positive. Doctors at infant-welfare centres could give us some valuable figures on this important point.

Kensington. RONALD CARTER.

SIR,—Your leading article of July 12 raises an important question. You quote opponents of state interference as casting doubts on the hundred-per-cent. reliability of any particular test or combination of tests. There is no hundred-per-cent. reliability either in biology or in sociology—trade, commerce, economics, politics and so on. As regards the liberty of the subject and professional secrecy, we do not need legal compulsion; a sixpenny book adequately composed and the common sense of the British people should be enough. The main difficulty originates from the nature of the disease, which covers the whole gamut of warfare from the deadly surprise raid to the trench-warfare of symbiosis. We distinguish by examination:—

(1) Patients with clinical symptoms and serological evidence.

(2) Patients without clinical symptoms but with serological evidence. These include patients treated unsatisfactorily and patients infected in a peculiar way—e.g. the women who conceive a syphilitic child from a syphilitic husband, or the children born of a syphilitic mother. They are not contaminated by the direct implantation of the specific germ but by absorption of an antigen-antibody mixture; thus the reaction is less powerful and the symptomatology wholly altered.

(3) Patients with neither clinical symptoms nor serological evidence. (*a*) Patients with latent disease, who are dangerous because they often do not know they are ill and infectious, and their victims do not know they are infected. Moreover, the virulence of the infectious factor is diminished, and thus

the usual lesions of skin and mucous membranes are missing. Often the break-down of an individual organ—liver, kidneys, heart or brain—is the first symptom of the disease. (*b*) Patients carefully treated and probably restored to good health. In spite of this their children are of inferior constitution, they may show a poor defence against infections and other harmful environmental influences, hypochromic anæmia, lymphocytosis, monocytosis or abnormalities of the endocrine system.

Group 3 does not come within the sphere of premarital and prenatal tests; these patients need the attention of a wise, cautious and energetic doctor who will take both a scientific and a social interest in them.

Cambridge. G. BROCK.

IN DEFENCE OF CHLOROFORM

SIR,—Increasingly as time goes on those who write with authority about anæsthetics tend to impose their veto upon the use of chloroform. To cite two recent instances, Professor Macintosh and Dr. Freda Pratt in their textbook issued from the Nuffield Department of Anæsthetics at Oxford devote a bare two pages to chloroform, and that only to banish it; and Dr. Langton Hewer, in a broad review of the subject in the *British Journal of Surgery*, states that chloroform is becoming increasingly, and he implies rightly, ousted in favour of "safer" agents. Even in Edinburgh, the cradle of chloroformists, the drug is now almost outlawed. All this may be merely the swing of the medical pendulum, but I submit that if it is allowed to continue without protest we may find ourselves deprived of one of our most potentially valuable allies, because the oncoming generation of anæsthetists will never learn to use it. To encourage these, then, and not with any intention of reviving an old controversy, this plea in defence is entered.

For many years in civil life it was my practice, and that, I suspect, of many more others than would be willing to admit it, to use small quantities of chloroform in conjunction with nitrous oxide and oxygen in some cases. Since working in the Army I have changed "some" to "all"—that is to say, all cases in which gas and oxygen plus premedication are not enough, and this means practically all soldiers. These now number upwards of 500, and can be regarded as a series in that in no case has ether been employed at any stage. The surgery done includes all the routine "cold" operations, together with gunshot wounds, accidents and acute abdominal conditions, and the patients are of a more or less uniform type apart from the presence or absence of shock. The results of this procedure, in the opinion of all who come in contact with the cases, are unmistakably superior to those of the gas-oxygen-ether combination, or of simple open ether. I have no statistics to offer, nor do I think that in this matter they are of so much value as the evidence of patients and particularly of ward-sisters, but I am sure that sickness, chest troubles (in so far as the anæsthetic used has anything to do with these), and general postoperative morbidity are reduced to a minimum. Furthermore, the anæsthetics are more consistently satisfactory at the time in what may be regarded as a difficult type of patient. On the debit side there has been one case of very mild jaundice lasting a few days after a hernia operation—that is all.

The contention here put forward is that this is not due either to luck or to any peculiar skill, but that gas-oxygen-chloroform is a safe and a sound anæsthetic, and one which should not be allowed to fall into disrepute. The first danger of chloroform—that of sudden cardiac failure during induction—is eliminated because induction is by gas and oxygen, and the chloroform is only added slowly later on. The second danger—respiratory depression followed by cardiac failure—can arise but in fact does not, because the amount of chloroform needed is extremely small and because with practice the early warnings of this condition are easy to detect and to check. The third danger, that of damage to the liver and metabolic upset, presumably depends on the concentration and amount of chloroform used, and is a theoretical possibility. With the exception of the case of mild jaundice mentioned, and which caused no-one any anxiety, it has never occurred in my experience either in the Army or in civil practice, and the risk seems to be at least no greater than that of some of the unfortunate sequelæ of, say, spinal anæsthetics. In this connexion it is encouraging to note that M. D. Nosworthy, speaking of the use of chloroform in patients with prolonged toxæmia, has given the opinion that "if the experimental work were re-done today, taking care to produce smooth anæsthesia with a clear airway and excess oxygen, the toxicity would probably be much less."

Finally, lest I should be accused of luring the young anæsthetist to disaster, I would lay stress on the fact that if the advantages of chloroform are to be enjoyed together with peace of mind, it is essential to learn the technique thoroughly, to practise it carefully, and to work with an adequate apparatus. But do not let us drop one of the most valuable members of our team simply because he will get out of hand unless properly managed.

D. H. BELFRAGE.

TREATMENT OF SUPERFICIAL GRANULATING SURFACES

SIR,—Mr. Edmunds in your issue of Aug. 2 shows how when a suppurating granulating surface is superficial antiseptic treatment by the Carrel-Dakin method can be accurately applied. May I mention another antiseptic method, zinc ionisation, which may also be used?

Before beginning treatment microscopic examination is made of smears from various parts of the raw area, especially near the edges. (A large number of organisms from one place suggests pocketing under the skin.) The area is then measured by tracing its outline on a film of celluloid, placing this on paper ruled in square centimetres and counting the squares covered by the outline. Since dosage is important it is necessary to have a certain measure of quantity as a unit. For ionisation treatment I chose one milliampere for one minute on a square centimetre and called this a "Leduc." It was found that 40 Leducs sterilised a surface. Perhaps less would be sufficient. During the last war an attempt was made to abolish suppuration in cases where this was only kept up by an infected discharge. It was seldom that the simple condition illustrated by Mr. Edmunds presented itself. When it did the technique adopted was as follows. The skin surrounding the raw area was painted with formalin gelatin as recommended by Sir Almroth Wright in one of his earlier papers. Layers of gauze soaked in a sterilised solution of zinc sulphate in gelatin were laid on the raw area to a height of ¼ in. The gauze slightly overlapped the edge of the skin. The positive electrode was kept in contact with the gauze by a bandage. At intervals cultures were made from the surface. If progress is to be made with this method of treatment it is necessary to determine the average dose which can be relied on to abolish suppuration on an accessible surface. This can be done if a sufficient number of cases in which the area can be measured are available. In cases where the area cannot be measured—e.g., sinuses—the dose can only be estimated. The tendency is to give too small a dose.

The advantage of zinc ionisation is the speed with which suppuration may disappear. Where the area is accessible and the dose is adequate suppuration ceases at once. This is due specially to two factors: first, to the fact that zinc albuminate is a bad culture medium for micro-organisms; and secondly, to the absence of irritation of the tissues immediately beneath the actual surface by the treatment.

Sidmouth. A. R. FRIEL.

DIAGNOSIS OF CRETINISM

SIR,—Your leading article of Aug. 2 rightly stresses the difficulties that may arise in the diagnosis of cretinism if clinical observation alone is accepted, and the advantage of conducting biological and biochemical tests. Some further points may be of interest:—

The precise meaning of the words "cretinism" and "myxœdema" gives rise to some difficulty. Presumably a certain clinical state is implied without stating whether the thyroid deficiency is complete or partial. Yet if tests are to be interpreted correctly and comparisons made with thyroidectomised animals, such a distinction is important. In the absence of suitable methods for detecting circulating thyroid hormone directly, the diagnosis of complete thyroid deficiency in man may only be made with any degree of certainty after elaborate tests during life, combined with post-mortem study

in the untreated state. There seems little doubt, however, that in some cases thyroid deficiency is not complete; thus a "cretin" aged 9 at present under observation shows B.M.R. — 38%, serum cholesterol 450 mg. per 100 c.cm., and no response to injected thyrotrophic hormone, yet the electrocardiogram shows no changes after 10 months without thyroid.

Although the urinary creatine is a valuable index of the response of the thyroid, considerable experience of the use of thyrotrophic hormone over the last 4 years has suggested to us that clinical observation of the pulse-rate, temperature, size of thyroid gland &c. is sufficient if a potent preparation is used in adequate quantities (*Quart. J. Med.* 1939, **8**, 195), and there seems no reason why this valuable test should not be applied in the outpatient department or in practice. It should be remembered, however, that there are cases with low basal metabolic rates and structurally normal thyroid glands who are resistant to the stimulation of thyrotrophic extracts.

No mention is made in your article of the electrocardiographic changes in cretinism. Although the evidence is not yet complete, it seems likely that in man and the rabbit total absence of the thyroid is always associated with characteristic changes, though the converse is not necessarily true—i.e., that the presence of the typical electrocardiogram means total absence of thyroid secretion. During the first year of life, the simplest confirmatory tests of thyroid deficiency appear to be a study of the development of the centres of ossification and the electrocardiogram; the characteristic low-voltage graph is not likely to be due to other causes at this age. Cases of dwarfism and mental retardation diagnosed as cretins on clinical grounds and treated with thyroid for years are often seen, and present a difficult problem. In the treated state, of course, all tests will be negative except an absence of response to injected thyrotrophic extract if no thyroid gland is present. To establish the diagnosis, thyroid extract may have to be withheld and serial electrocardiographic, biochemical and metabolic studies made. In man and the rabbit it may take 80 days or longer for typical electrocardiographic changes to appear after withdrawing all thyroid.

Finally, more sensitive methods of assay have demonstrated the presence of circulating thyrotrophic substances in some subjects with thyroid deficiency (Collard, H. B. et al. *Clin. Sci.* 1940, **4**, 323), and if the thyroid behaves in a similar manner to the gonadal system in suppressing pituitary activity in regard to its own stimulating substance, then a further test may be evolved to help in distinguishing between cases of complete and partial thyroid deficiency.

E. P. SHARPEY-SCHAFER.

British Postgraduate Medical School.

TRAINING AND EMPLOYMENT FOR THE DISABLED

IN a circular (N. 2449) issued on Aug. 14 the Ministry of Health explain the arrangements they have made with the Ministry of Labour for the resettlement and vocational training of the disabled.

The Ministry of Labour already administer a scheme of vocational training in occupations connected with munitions, and this is available for disabled people who are capable of taking the courses. In addition, the ministry proposes to set up special training courses covering a wider range of occupations for disabled people only. The scheme will be open to men and women over 16 who are unable because of disablement to resume their former occupations. Training will be given at the ministry's own centres, at institutions specialising in the training of cripples, at technical colleges administered by local education authorities, and by arrangements made with individual employers. The scheme will not be limited to members of the Forces and civil defence services, or civilians disabled by enemy action, but will include people disabled in industry or through other causes. Training will be limited at present to those who appear likely, when trained, to obtain employment under ordinary industrial conditions. Arrangements for training will be made by employment exchanges, who will send a representative to interview a patient on being notified by his hospital. The exchanges will also advise patients who do not need special training but require information about returning to their previous employment or taking up some other.

Obituary

CHARLES ARCHIBALD SCOTT RIDOUT

M.S. LOND., F.R.C.S.

Mr. C. A. Scott Ridout of Southsea, who died on Aug. 9 after a trying illness of some three months, was the son of the late Staff Surgeon Charles Lyon Ridout, R.N. He was born in Devon in 1875 and educated at Sherborne, where he played for the cricket XI and the rugby XV. He qualified M.R.C.S. from Bart's in 1899, and took his London degree two years later. While holding house-appointments in the throat department at Bart's and at the North Staffordshire Infirmary and Eye Hospital he continued to equip himself for his specialty, obtaining his M.S. in 1903 and in 1904 the F.R.C.S. and a Jeaffreson exhibition. In this same year he also began his long association with the Royal Portsmouth Hospital. Two years later he was appointed honorary pathologist and soon he was elected to the surgical staff. He also became surgeon to the Portsmouth and Southern Counties Eye and Ear Hospital, where he was later in charge of the aural and throat department. During the last war he served, with the rank of major, as a surgeon specialist at the 5th Southern General Hospital at Portsmouth, and later with the 29th Stationary Hospital in Salonika and Italy, finally returning to Portsmouth as divisional surgical officer for ear, nose and throat cases.

A. G. O. writes: As Scott Ridout's junior it was my privilege to watch his methods and admire his keenness and energy. He was anxious to encourage and help his juniors in every way, and later on, when our paths in surgery diverged, it was always a pleasure when he dropped in of an evening to discourse on some particular case and discuss its bearing in other fields of surgery. The time came when as a patient I saw how his amazing energy seemed to be entirely directed to each individual patient and how despite his busy life he found time to cheer and encourage one's relatives and help to relieve their anxiety.

FRANK HAYDON

L.R.C.P.

Dr. Haydon, who died at Bideford on Aug. 1 in his eightieth year, was for over 35 years secretary to the court of examiners of the Society of Apothecaries. During his period of office from 1895 to 1930 the smooth working of the examinations was largely due to his careful organisation. Many candidates will remember him for his courtesy, and he was always sympathetic to those who were referred. Soon after he qualified from the Westminster Hospital in 1891 Dr. Haydon became interested in ophthalmology, and after holding a clinical assistantship at Moorfields he was for five years assistant surgeon to the Western Ophthalmic Hospital. For many years he was also examiner of eyesight to the London and South Western Railway (later the Southern Railway) and his statistical eyesight tables and Railway Test Type Case were based on this experience. He also compiled an ophthalmic atlas for recording pathological conditions of the fundus by means of superimposed layers of colour.

BERTRAM SHIRES

M.B. EDIN., D.M.R.E.

Dr. Shires, who died at his house in Wimpole Street on Aug. 8, was one of the band of consultants who continued to live in London in spite of the war. His work at St. Thomas's Hospital in London and Godalming, and at Great Ormond Street took up almost the whole of his time, and entailed much exhausting travelling, while at the end of a tiring day he would take his turn at fire-watching. On the day of his death, after a night of pain, he drove himself to Godalming and put in an afternoon's work there. He died in his sleep the same night.

Bertram Shires had qualified in medicine at Edinburgh just before the last war, and he joined the R.A.M.C. to serve as a major. When he returned to civil life he took up radiology and obtained the Cambridge D.M.R.E. in 1921. He joined the X-ray department at St. Thomas's in 1924 as chief assistant, becoming assistant radiologist in 1927, and director of the department in

1939. He also held the appointments of radiologist to the Hospital for Sick Children, Great Ormond Street, and consulting radiologist to the Infants Hospital, Vincent Square. Dr. Shires leaves a widow and three children.

A colleague writes: Those who worked with Bertram Shires knew that they could obtain from him shrewd clinical judgment apart from his expert radiological opinion. At St. Thomas's we mourn a loyal friend and a colleague on whose level-headed advice we could always count. Always an indefatigable worker, during the war Shires had undertaken responsibilities which probably helped to bring about his untimely end.

Public Health

Poliomyelitis in Slough

SINCE July 15 there have been 33 cases of poliomyelitis in the Slough district, 17 being in the borough itself and the remainder in Stoke Poges and Wexham, with 1 in Datchett and 1 in Taplow. Most of the cases have been in children, the youngest being aged 3 years, but there was one patient aged 16, one 18 and one 30. There have been two deaths, both in children. The first died 4 days after the onset; the second developed sudden respiratory paralysis on the morning of the fourth day and in spite of treatment in a Both respirator died with cardiac failure early next morning. There have been three households with two proved cases each. One of the children who died developed the disease on Aug. 11 and his elder brother developed it on Aug. 19. The cerebrospinal fluid has shown an increase in cells in all cases ranging from 23 to 700 per c.mm., mostly lymphocytes. The cell-count has borne no apparent relation to the severity; some cases with high counts have aborted and some of the worst have shown only a few cells. The earlier cases had an unusually long meningeal stage. All the patients have been treated with M. & B. 693, and it is hoped to use convalescent serum in addition when supplies come through from Harrogate.

Infectious Disease in England and Wales

WEEK ENDED AUGUST 9

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 804; whooping-cough, 3138; diphtheria, 677; paratyphoid, 150; typhoid, 38; measles (excluding rubella), 2276; pneumonia (primary or influenzal), 408; puerperal pyrexia, 127; cerebrospinal fever, 121; poliomyelitis, 30; polio-encephalitis, 2; encephalitis lethargica, 3; dysentery, 40; ophthalmia neonatorum, 72. No case of cholera, plague or typhus fever was notified during the week.

Deaths.—In 126 great towns there were 3 (2) deaths from enteric fever, 2 (0) from scarlet fever, 19 (3) from whooping-cough, 2 (0) from measles, 18 (1) from diphtheria, 51 (3) from diarrhœa and enteritis under 2 years, and 2 (0) from influenza. The figures in parentheses are those for London itself.

Leicester reported 1 fatal case of enteric fever. There were 4 deaths from diphtheria at Liverpool. Birmingham and Nottingham each reported 5 deaths from diarrhœa and enteritis under 2 years.

The number of stillbirths notified during the week was 192 (corresponding to a rate of 42 per thousand total births), including 14 in London.

GERMAN BIRTHS, MARRIAGES AND DEATHS.—The *Deutsche Medizinische Wochenschrift* for July 4 (p. 742) gives a brief survey of German vital statistics for the first quarter of 1941. In the great towns of Germany in this period there were 10·2 marriages per 1000 of the population. This was 0·1 more than in the same period of 1939. There were 15·3 births per 1000 of the population, an increase of 4·1 on the same period for 1933 but a fall of 4 from the first quarter of 1940 and of 1·9 from the first quarter of 1939. The death-rate was 14·5 per 1000, which was 2 less than for the same quarter in 1940 and 0·8 less than for the same quarter of 1939. This decrease is attributed to a fall in the deaths from pulmonary infections, heart diseases, apoplexy and old age.

Notes, Comments and Abstracts

APPARATUS FOR SUCTION DRAINAGE

ARTHUR EDMUNDS, C.B., M.S. LOND., F.R.C.S.

THE apparatus here described was designed for the treatment of empyema by suction drainage. It embodies no new principles, but it has the great advantage that the materials for its construction are easily obtainable and their cost is negligible. Its manufacture presents no difficulty to anyone who can use a soldering iron.

Two large tins (A and B in fig. 1) are required—five-gallon Dettol tins answer the purpose admirably. These tins have a filling inlet E and a tap for withdrawing the fluid. This outlet tap is not used for the present purpose. Into each tin two short lengths of brass tube are soldered, one at the top and one at the bottom (*a a'*, *b b'*). Dettol tins are not quite thick enough to support the brass tubes, and the junction should be reinforced by a copper plate about as big as a penny, the whole being "sweated" together. The two lower tubes are connected by a rubber tube C, controlled by a screw tap D. Over each filling inlet E a piece of thin sheet rubber is fastened—the wrist part of an ordinary operating glove does quite well and it can be fastened in position by the thickened edge of the glove or a rubber band.

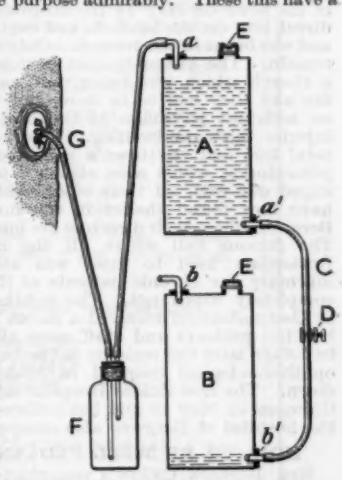

FIG. 1.

If tin A is filled with water and put on a stand a short distance above B, on opening the screw tap D water flows from A to B, and air is aspirated through *a*. If both upper tubes are freely open the rubber diaphragms over the inlet openings are flat, but if there is any resistance to the ingress of air through the upper tube (*a*) the diaphragm on tin A will become concave.

The suction apparatus thus arranged is connected to the drainage-tube G which goes into the pleural cavity, a bottle F with two tubes through the stopper, or a Woulfe's bottle, being interposed to catch the discharge. If the negative pressure in the pleural cavity is to be maintained, the junction between the drainage-tube and the chest wall must be as airtight as possible. A good junction can be made as follows:

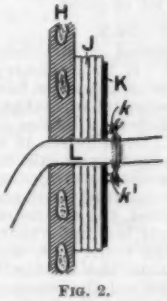

FIG. 2.

Cut some pieces of lint into discs about 4 in. in diameter, with a hole in the centre of such a size that the drainage-tube fits reasonably tightly. These pieces of lint are soaked in melted Vaseline, which is allowed to cool on them so that they are heavily charged with it. A piece of sheet tin is also wanted with a hole in the centre through which the drainage-tube can pass. A small wire ring is soldered on each side of this hole. The method of assembling these parts is shown in fig. 2, which represents them in diagrammatic section. The tube L coming through the chest wall H passes through the lint J and then through the tin plate K. A silkworm-gut suture is tied to the loops on this plate (*k k'*) and then tied firmly round the drainage-tube. The whole is then strapped to the chest wall with elastic strapping. Gauze, wool and a manytail bandage are applied around the whole of this to absorb any leaking fluid and to keep the vaseline from soiling sheets. The whole will need changing every three or four days.

The degree of negative pressure can be regulated by the difference of level between the two tins. When the upper tin is empty all that is necessary is to reverse the

position of the tins, and to transfer the suction tube to the tin which is now uppermost. It should not be necessary to do this more than once a day, and it may be that the apparatus will need no alteration for two or three days. The indicator of the partial vacuum is the rubber diaphragm, which can not only be seen but felt, and it is easy for the nurse on night duty to feel whether the apparatus is working satisfactorily.

THE HOSPITALS OF ROTTERDAM

THE damage done to the hospitals of Rotterdam during the German air-raids in May, 1940, is described in the *Schweizerische Medizinische Wochenschrift* for June 7 (p. 724). During the methodical laying-waste of the centre of the town on May 14 the hospital at Coolsingel, after direct hits on the kitchens and engine-house, caught fire and was burnt to the ground. Only a few blackened walls remain. The evacuation of patients was difficult, for a church which was being used as a refuge also took fire and they had to be moved once more. Dr. Sekir, an assistant physician of the hospital, died from his injuries the same evening. The medical library was a total loss and the town's pathology and bacteriology laboratories, which were attached to the hospital, were wiped out with all their equipment. The laboratories have now found shelter in the municipal hospital at Bergweg where their directors are busy on reorganisation. The famous hall where all the medical societies of Rotterdam used to meet was also destroyed. The infirmary for chronic patients at Raampoortstraat was completely wiped out. The ophthalmological hospital at Oostmolenwerf received a direct hit during Whitsun, but the patients and staff were able to take shelter; two days later the remains of the building and the other ophthalmological hospital in Nadorstraat were burnt down. The new Zuider Hospital was taken over by the Germans on May 10 and has suffered little damage, and the hospital at Bergweg also escaped.

HOW TO BE WELL FED AND PATRIOTIC

Mrs. Barbara Callow's pamphlet "Good Health on War-time Food" (O.U.P. Pp. 32. 6*d*.), is based on talks given to working-class folk since the war broke out, and she shows understanding of their point of view and criticisms. The last chapter should be read first and then again in its proper place after reading the rest of the book. The only criticism is that some verbal woolliness might be omitted. Mrs. Callow writes "... all of us need a certain amount of body-building food every day." Surely "all of us need body-building food every day" is as true, strong, scientific and understandable. But these are minor offences which need worry only the pernicketty scientist, or the paper controller, and if the booklet is read and understood and its precepts practised it should do a lot of good.

FEEDING THE MULTITUDES

THE Ministry of Food have published a sixpenny pamphlet (Canteen Catering. Pp. 84. H.M. Stationery Office), as a guide to those in charge of canteens, not only as regards quantities of foods essential in making prescribed dishes but as regards the dietetic qualities of foods, dishes and menus. Prof. J. C. Drummond, in a foreword, says that "the aim in planning meals in canteens should be to provide in one meal during the day a substantial proportion of all the essential nutrients required by the body. If this is ensured, the nature of the other meals becomes correspondingly less important. By making good the deficiencies of the home diet, the canteen meals are of greatest benefit to the worker." If the canteen manager faithfully carries out the instructions given in the early pages of the pamphlet the feeding of the people in canteens will reach a high level. It is particularly sound advice to increase the quantity of vegetables served, to give more than one vegetable in addition to potatoes, and to serve a second vegetable with fish and chips, and sausage and mashed potatoes. The advice on how to introduce new and unfamiliar dishes is also good sense, if Macchiavellian. The only snag is that it needs a trained dietitian to carry out the advice, and it is doubtful if there are more than 250 trained dietitians in the whole of Great Britain. The training of dietitians has been more or less in abeyance since the war started and we need such for feeding the people during war-time and still more so in the subsequent peace. One or two minor grumbles may be permitted. What does this sentence from the foreword mean? "They [the protective foods] are called 'protective' because they are in one respect or another rich in the vitamins or other constituents vitally important for health." Are not calories and protein vitally important for health, and are white sugar and salt pork "protective foods"? On the whole the pamphlet can be strongly recommended not only to supervisors of canteens but to everyone who has to cater for large groups of people.

MEDICAL HONOUR.—The King has given permission to Flight Lieutenant W. P. Griffin, M.B. Dubl., R.A.F.O., to wear the insignia of the order of the White Eagle, fifth class, conferred on him by the King of Jugoslavia for valuable services rendered in connexion with the war.

COURSES ON WAR SURGERY.—A course on war surgery of the extremities will be held at the British Postgraduate Medical School from Sept. 1 to 5. A course on war surgery of the abdomen will begin on Sept. 15, and a course on war medicine on Sept. 29. Further information may be had from the dean of the school, Ducane Road, London, W.12.

A GERMAN COUPON CONCESSION.—In the *Deutsche Medizinische Wochenschrift* for July 11 (p. 770) the German Food Minister announces that bread coupons marked with an R, which are intended for rye bread (Roggenerzeugnisse), may only be exchanged for white bread coupons if a medical certificate is submitted. Doctors may give a certificate for this exchange to those suffering from diseases of the stomach, bowels or gall-bladder, to patients who have difficulty in chewing, or to those who are hypersensitive to rye.

Appointments

CRAIG, J. H., M.B. Durh.: medical registrar at Royal Victoria Infirmary, Newcastle-on-Tyne.

GAISFORD, W. F., M.D. Lond., F.R.C.P.: consulting physician to the Warwickshire hospital services.

HEATHER, J. C., M.D. Lond., M.R.C.P.: examining factory surgeon for Coventry East.

REID, J. L., B.M. Oxfd., D.L.O.: junior surgical registrar at Royal Victoria Infirmary, Newcastle-on-Tyne.

WALDER, D. N., M.B. Bristl.: junior surgical registrar at Royal Victoria Infirmary, Newcastle-on-Tyne.

Colonial Services.—The following appointments are announced:

BLOK, E. A., L.R.C.P.E., assistant director of medical services, Ceylon.

BOWESMAN, CHARLES, M.D. Dubl., F.R.C.S.E., D.T.M. & H., medical officer, Gold Coast.

GOSDEN, MINNIE, M.B. Lond., D.T.M. & H.: pathologist, Sierra Leone.

REID, J. D., M.B., D.P.H., D.T.M. & H.: medical officer, Sierra Leone.

UTTLEY, K. H., M.D. Camb., D.T.M. & H.: senior medical officer, Hong Kong.

Births, Marriages and Deaths

BIRTHS

BIRD.—On Aug. 17, in Reading, the wife of Dr. J. G. Bird—a son.

BOWLBY.—On Aug. 11, at Broad Chalke, Salisbury, the wife of Major John Bowlby, R.A.M.C.—a son.

CURRANT.—On Aug. 12, at Haslemere, the wife of Dr. E. J. Currant—a daughter.

DE SWIET.—On Aug. 15, at Ripley Court, Surrey, the wife of Dr. John de Swiet—a son.

FORREST-HAY.—On Aug. 8, at Bewdley, the wife of Captain Graham Forrest-Hay, R.A.M.C.—a son.

HYSLOP.—On Aug. 14, the wife of Dr. W. A. Hyslop of Settle, Yorks—a son.

LE VAY.—On Aug. 15, at Oxford, the wife of Mr. A. D. Le Vay, F.R.C.S.—a son.

PRICE.—On Aug. 12, at Beaconsfield, the wife of Major A. E. Kingsley Price, R.A.M.C.—a daughter.

MARRIAGES

BEALES—ROSSITTER.—On July 26, in London, Philip Hulme Beales, M.R.C.S., to Valerie Maude Rossitter.

FEARNLEY—ANDREWS.—On Aug. 16, at Graffham, Sussex, George Roche Fearnley, M.B. to Joy Andrews.

MATHISON—LEES.—On July 5, at Darwen, Alexander Mathison, M.R.C.S., surgeon lieutenant, R.N.V.R., of Bedford, to Betty Lees.

RAWLINSON—CLAFTON.—On Aug. 9, in London, Peter Goodwin Rawlinson, M.R.C.S., to Mary Clafton.

SMYTH—RUSHTON.—On Aug. 12, at Claughton-on-Brock, William Francis Smyth, M.B., lieutenant, R.A.M.C., to Phyllis Anne Rushton.

YOUNG—CHURCH.—On Aug. 11, at Limpsfield Chart, William Brewitt Young, M.B., to Betty Church.

DEATHS

JAMESON EVANS.—On Aug. 13, at Froncithyn, Aberdovey, John Jameson Evans, M.D. Birm., M.B. Edin., F.R.C.S., of Edgbaston.

FAWKES.—On Aug. 14, at Midhurst, Sussex, Marmaduke Fawkes, O.B.E., M.B. Lond.

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(*Brit. Med. J.*, 1941, *June 14th*, 895)

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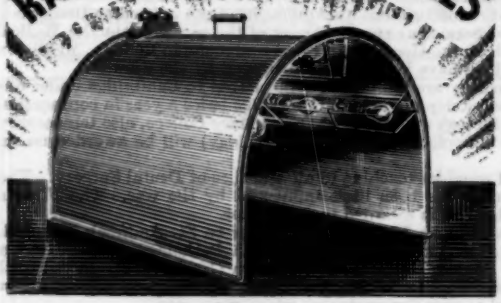

Philips all metal cradle with two switch variable heat control, combining minimum weight with maximum strength. The ideal bath for ward use. Conforms to Ministry of Health recommendations. 6-lamp, 9-lamp and 12-lamp sizes.

As supplied to the leading Hospitals and Institutions throughout the country.

IMMEDIATE DELIVERY ALL TYPES

PHILIPS METALIX

(Philips Lamps Ltd.). Century House, Shaftesbury Ave., London. W.C.2.

The Royal Cancer Hospital (Free)

(Incorporated under Royal Charter),
Fulham-road, London, S.W.3.

A Course of Study in Medical Radiology qualifying for the DIPLOMA IN MEDICAL RADIOLOGY of the University of London and the Royal Colleges of Physicians and Surgeons will commence on MONDAY, 6TH OCTOBER, 1941, at the Royal Cancer Hospital, Fulham-road, London, S.W.3.

The Course, arranged in conjunction with Lectures at the British Institute of Radiology, includes Theoretical and Practical Instruction in Clinical Radiology (Radiation Therapy and X-ray Diagnosis) and also Physics applied to Medical Radiology.

Full particulars may be obtained on application at the above address to the Secretary. CLEMENT COBBOLD, Secretary.

Examining Board in England

BY THE
ROYAL COLLEGE OF PHYSICIANS OF LONDON
AND THE
ROYAL COLLEGE OF SURGEONS OF ENGLAND.

Notice is hereby given that the following Examinations will commence on the dates stated below :—

DIPLOMA IN PUBLIC HEALTH
MONDAY, 29TH SEPTEMBER.

DIPLOMA IN CHILD HEALTH
MONDAY, 22ND SEPTEMBER.

Candidates who have fulfilled the necessary conditions, and who desire to present themselves for examination, must give notice in writing to the Secretary, Examination Hall, 8–11, Queen-square, London, W.C.1, at least twenty-one days before the date of the Examination, transmitting at the same time such certificates as may be required by the regulations of the Board. HORACE H. REW, Secretary.

Royal College of Surgeons of England.

LICENCE IN DENTAL SURGERY

Notice is hereby given that the following Examinations will commence on the dates stated below :

FIRST PROFESSIONAL EXAMINATION
MONDAY, 22ND SEPTEMBER.

SECOND PROFESSIONAL EXAMINATION
TUESDAY, 23RD SEPTEMBER.

Candidates are required to give at least twenty-one days' notice of their intention to present themselves for the examination to the DIRECTOR OF EXAMINATIONS (Mr. Horace H. Rew), Examination Hall, 8–11, Queen-square, London, W.C.1, from whom all particulars relating thereto may be obtained.

ALUZYME

NON-AUTOLYSED YEAST

The B Complex agent of choice ; it provides 1140 I.U. per oz. of Vitamin B1 alone, and is rich in *all* the other factors. The B Vitamins form a therapeutic synergy ; each contributes to the corrective effect. The high potency of all the factors in aluzyme ensures full synergic action. Official Vitamin Assay Reports and Confirmatory Tests prove that aluzyme is by far the

RICHEST SOURCE OF THE ENTIRE B COMPLEX

Specific in all forms of Avitaminosis B, particularly neurological symptoms, dermatitis, and (P-P factor) inflammatory conditions of the alimentary tract. Best for increased requirements of gestation and lactation. Good results with iron in microcytic anæmia. Sample sufficient for diagnostic purposes, and Memoranda with full statement of certified Vitamin potency, on request.

ALUZYME PRODUCTS
PARK ROYAL ROAD, LONDON, N.W.10

BRITISH POSTGRADUATE MEDICAL SCHOOL

(UNIVERSITY OF LONDON)

WAR SURGERY OF THE EXTREMITIES

1st to 5th September, 1941

Monday, 1st Sept.	10 A.M.	General Principles of War Surgery of the Limbs.	Prof. G. Grey Turner, LL.D., D.Ch., M.S., F.R.C.S., F.R.A.C.S., F.A.C.S.
	11.15 A.M.	Administrative Problems in War Surgery.	Lt.-Col. T. B. Nicholls, M.B., Ch.B.
	2 P.M.	General Aspects of Sepsis in War Wounds.	Lord Horder, G.C.V.O., M.D., F.R.C.P.
Tuesday, 2nd Sept.	10 A.M.	Wounds of the Extremities with or without Fractures.	Dr. J. Trueta.
	1.30 P.M.	Radiological Investigation of Wounds of the Extremities.	Dr. J. Duncan White, M.B., Ch.B., D.M.R.E.
	2.30 P.M.	Shock	Dr. J. McMichael, M.D., F.R.C.P., F.R.S.E.
Wednesday, 3rd Sept.	10 A.M.	War Burns	Mr. H. J. B. Atkins, F.R.C.S.
	11.15 A.M.	Sepsis	Prof. J. Paterson Ross, F.R.C.S.
	1.30 P.M.	Blood Transfusion	Dr. Janet Vaughan, D.M., F.R.C.P.
	2.30 P.M.	Demonstration on the Cadaver of Useful Exposures.	Mr. A. K. Henry, M.B., M.Ch., F.R.C.S.
Thursday, 4th Sept.	10 A.M.	Wounds of Joints	Mr. V. Zachary Cope, M.D., M.S., F.R.C.S.
	11.15 A.M.	Amputations	Mr. Jeaner Verrall, F.R.C.S.
	1.30 P.M.	Tetanus	Dr. Leslie Cole, M.D., F.R.C.P.
	2.30 P.M.	Injuries of Hands and Feet	Mr. A. K. Henry, M.B., M.Ch., F.R.C.S.
Friday, 5th Sept.	10 A.M.	Secondary Hæmorrhage ..	Surg. Rear-Admiral G. Gordon-Taylor, O.B.E., M.S., F.R.C.S.
	11.15 A.M.	Traumatic Aneurysm ..	Surg. Rear-Admiral G. Gordon-Taylor, O.B.E., M.S., F.R.C.S.
	2 P.M.	Gas Gangrene and other Anaerobic Infections.	Mr. G. T. Mullally, M.C., M.S., F.R.C.S.
	3 P.M.	Plaster Technique	Mr. A. Ruscoe Clarke, F.R.C.S.

The fee for the Course will be one guinea, but no fee will be charged in the case of Officers of the Armed Forces and whole-time Officers of the E.M.S. who submit a leave certificate and register their names before the commencement of the Course.

Applications for admission should be addressed to the DEAN, British Postgraduate Medical School, Ducane-road, W.12.

Further War Surgery Courses will commence as follows :—

WAR SURGERY OF THE ABDOMEN .. MONDAY, 15TH SEPTEMBER.
WAR MEDICINE .. .. .. MONDAY, 29TH SEPTEMBER.

L. M. S. S. A.

FINAL EXAMINATION: SURGERY, October 13th, November 10th, December 8th; MEDICINE, October 20th, November 17th, December 15th; MIDWIFERY, October 21st, November 18th, December 16th.

For regulations apply REGISTRAR, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

THE LONDON HOSPITAL MEDICAL COLLEGE AND DENTAL SCHOOL

(UNIVERSITY OF LONDON)

THE WINTER SESSION OPENS ON WEDNESDAY, OCTOBER 1st

The London Hospital remains the headquarters of the Medical School. The beds have been reduced from the pre-war figure of 900 to 350; 100 are held in reserve for air-raid casualties, but an Annexe has been opened at Brentwood with 360 beds. The organisation of the Emergency Medical Service at the beginning of the war brought the Medical School into relation, through the London Sector Scheme, with all the Hospitals in Essex and many in London, Middlesex and Hertfordshire. The clinical facilities in the Medical School have been greatly increased by the war.

The Departments of Anatomy, Physiology and Pharmacology are temporarily transferred to Cambridge under our staff of Professors and Readers. Courses for the Primary Fellowship are held in Cambridge twice a year in conjunction with St. Bartholomew's Hospital. Chemistry, Physics and Biology are taught at Queen Mary College, also temporarily in Cambridge. The Price Entrance Scholarship in Science (Chemistry, Physics and Biology) will be awarded on an Examination in April.

The Dental School remains at the London Hospital and provides teaching in all branches of Dental Surgery. The attendance of patients in the Dental Out-patient Department has been little influenced by the war. The Francis Farmer Entrance Scholarship (in Chemistry, Physics and Biology) is awarded in September.

Clinical students are posted in the first instance to Chase Farm Hospital, Enfield, or to St. Andrew's Hospital, Billericay, near the London Hospital Annexe at Brentwood, and then, after a Course in Pathology, to the London Hospital Annexe at Brentwood or to the North Middlesex County Hospital at Edmonton (1000 beds). In the final year, after a period as Student House Officers at Sector Hospitals, they return to the London Hospital for preparation for the final examination. This organisation can be adapted to any circumstances which may arise.

A large number of House Appointments for recently qualified students are available at the London Hospital, the Annexe at Brentwood, Chase Farm, E.M.S. Hospital, the North Middlesex County Hospital and the Hospitals in Sector II and the 4th Civil Defence Region.

Three entrance scholarships in Anatomy, Physiology, Pharmacology and Biochemistry are awarded in April and June. Funds to the value of over £100,000 are available for Medical Research.

The College provides an Athenæum, Dining Hall, Library, Museum, Gymnasium, Fives Court, three Tennis Courts and two Squash Courts. All are in use during the war. The athletic ground at Hale End can easily be reached from the Hospital by train or road.

Further details may be obtained from the Dean, A. E. CLARK-KENNEDY, M.D., F.R.C.P., Physician to the Hospital and Fellow of Corpus Christi College, Cambridge, who is always ready to see students by appointment at the London Hospital or at Corpus Christi College at Cambridge.

Turner-street, London, E.1. Station: Whitechapel (Underground) opposite the Hospital. Tel.: BIShopsgate 2456.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

(UNIVERSITY OF LONDON)

Incorporating the Ross Institute

COURSES OF INSTRUCTION IN

TROPICAL MEDICINE AND HYGIENE

Arrangements have been made with the Liverpool School of Tropical Medicine and with the Colonial Office that for the duration of the war courses of instruction in Tropical Medicine and Hygiene will be held alternately in London and Liverpool. The first course, lasting five months, will be held in London and will commence on 22nd September, 1941. The next course will be held in Liverpool at a date to be fixed later.

The course given at the London School is designed primarily to prepare qualified medical practitioners for the examination of the Conjoint Board for the Diploma in Tropical Medicine and Hygiene, but members of the class may qualify for a School Certificate in Tropical Medicine and Hygiene at the end of four months.

The fee for the course is £40.

Arrangements can be made for admission of students to certain parts of the course separately. The fee for these short periods of instruction is 2 guineas per week.

Further information regarding the London Course may be obtained from the Secretary, London School of Hygiene and Tropical Medicine, Keppel-street (Gower-street), W.C.1. (MUSeum 3041.)

University of London.

EXAMINERSHIPS IN MEDICAL SUBJECTS.

The Senate invite applications for Examinerships in the following subjects of Examinations in the Faculty of Medicine for 1942:—

FORENSIC MEDICINE; MEDICINE; NEUROLOGY; SURGERY.

Applications must be received not later than 1st October, 1941, by the PRINCIPAL, University of London, c/o Richmond College, Richmond, Surrey, from whom further particulars and forms of application may be obtained.

CHISWICK HOUSE,

PINNER, MIDDLESEX.

Telephone: PINNER 234.

A Private Hospital for the Treatment and Care of Mental and Nervous Illnesses in both Sexes.

A modern country house, 12 miles from Marble Arch, in attractive and secluded surroundings. Fees from 10 guineas per week inclusive. Cases under Certificate, Voluntary and Temporary Patients received for treatment.

DOUGLAS MACAULAY, M.D., D.P.M.

CITY OF LONDON MENTAL HOSPITAL

Near DARTFORD, KENT.

Ladies and Gentlemen received for treatment under certificates, and without certificates as either VOLUNTARY or TEMPORARY PATIENTS, at a weekly fee of £2 9s., and upwards.

STRETTON HOUSE,

Church Stretton, Shropshire.

ESTABLISHED IN 1853.

A PRIVATE HOME for the treatment of gentlemen suffering from Mental and Nervous illness, including the allied Disorders of Alcoholism and the Drug Habit. All types of early Mental and Nervous Cases are received without Certificates as Voluntary Patients under the provisions of the Mental Treatment Act, 1930. Bracing hill country. See "Medical Directory," p. 2358.—Apply to the Medical Superintendent. 'Phone 10 P.O., Church Stretton.

Telephone: WELbeck 2728 Telegrams: "ASSISTIANO, LONDON"
For MEDICAL, SURGICAL, and
MENTAL NURSES
Male or Female
THE NURSES' ASSOCIATION
In conjunction with the MALE NURSES' ASSN.
29, YORK ST., BAKER ST., LONDON, W.1
Mrs. MILLICENT HICKS, Superintendent W. J. HICKS, Secretary

THE COPPICE, NOTTINGHAM.
HOSPITAL FOR MENTAL DISEASES.
President: The Right Hon. LORD BELPER.

This Institution is exclusively for the reception of a limited number of PRIVATE PATIENTS of both sexes, of the UPPER and MIDDLE CLASSES, at moderate rates of payment. It is beautifully situated in its own grounds, on an eminence a short distance from Nottingham, and commands an extensive view of the surrounding country; and from its singularly healthy position and comfortable arrangements affords every facility for the relief and cure of those mentally afflicted. Voluntary and Temporary Patients received. Occupational Therapy. For terms, &c., apply to the Medical Superintendent.
Telephone: 64177 Nottingham.

THE RETREAT, YORK

The Pioneer Hospital, opened 1796, for the humane treatment of those suffering from Nervous and Mental Disorder

This Hospital ot 200 beds, administered by a Committee of the Society of Friends, combines what is best in the investigation and treatment of nervous illness with a sympathetic and friendly atmosphere. Last year 121 patients were admitted, of whom 80 were voluntary cases.

Much curative work is accomplished in our mental hospitals to-day and the recovery rate compares very favourably with that of our general hospitals.

For information and terms of admission apply to:—
The Physician Superintendent,
ARTHUR POOL, M.R.C.P.
(Telephone: York 3612)
who is available for consultation

TOR-NA-DEE SANATORIUM Managing Director: DAVID LAWSON, M.D., F.R.S.E.
FOR THE TREATMENT OF PULMONARY TUBERCULOSIS AND ALLIED DISEASES
Medical Superintendent: R. Y. KEERS, M.D.(Edin.)
For prospectus apply to The Secretary, Tor-na-Dee, Murtle, Aberdeenshire Telephone: Cults 107

CALDECOTE HALL
NUNEATON
WARWICKSHIRE
('Phone: Nuneaton 241)
Residential treatment of
"Nervous Disorders" & Alcoholism
(Certifiable cases are not received)
This beautiful mansion situated in the heart of the country (less than two hours from London by L.M.S.R.) and surrounded by charming pleasure grounds in which games and outdoor occupational therapy are available is devoted to the treatment of Alcoholism and "Nerves" by psychotherapeutic and ancillary methods.
Illustrated Brochure and particulars obtainable from A. E. CARVER, M.D., D.P.M., Resident Medical Superintendent.

SHAFTESBURY HOUSE FORMBY-BY-THE-SEA Nr. LIVERPOOL
Specially built and licensed for the care and treatment of a limited number of Ladies and Gentlemen suffering from NERVOUS and MENTAL breakdown. Voluntary and certified patients received. Ladies also admitted as Temporary Patients without certification. Terms moderate. *Apply*, RESIDENT PHYSICIAN, who may be seen in Liverpool, by appointment. *Tel. No.* 8 *Formby.*

PECKHAM HOUSE, 112, Peckham Road, London, S.E.15
Telegrams: "Alleviated, London" Telephone: Rodney 2641-2642
A Private Mental Hospital, for Ladies and Gentlemen suffering from Nervous and Mental Illness, where the amenities of a comfortable home are combined with full investigation and every well-established modern treatment.
Terms from 3½ guineas weekly.
Illustrated Prospectus may be obtained from the Physician Superintendent.

HAYDOCK LODGE,
NEWTON-LE-WILLOWS, LANCASHIRE.
For the reception and treatment of PRIVATE PATIENTS of both sexes of the UPPER AND MIDDLE CLASSES suffering from Mental and Nervous Disorders, Alcoholism and Drug addiction, either voluntarily, temporarily, or under certificate. Patients are classified in separate buildings according to their mental condition. Situated in park and grounds of 400 acres. Self-supported by its own farm and gardens in which patients are encouraged to occupy themselves. Every facility for indoor and outdoor recreation. For terms, prospectus, etc., apply MEDICAL SUPERINTENDENT. *'Phone:* Ashton-in-Makerfield 7311. *Tele. Address:* Street, Ashton-in-Makerfield.

ST. ANDREW'S HOSPITAL

FOR NERVOUS AND MENTAL DISORDERS,

NORTHAMPTON

FOR THE UPPER AND MIDDLE CLASSES ONLY.

PRESIDENT: THE MOST HON. THE MARQUESS OF EXETER, K.G., C.M.G., A.D.C.

MEDICAL SUPERINTENDENT: THOMAS TENNENT, M.D., M.R.C.P., D.P.H., D.P.M.

This Registered Hospital is situated in 130 acres of park and pleasure grounds. Voluntary patients, who are suffering from incipient mental disorders or who wish to prevent recurrent attacks of mental trouble; temporary patients, and certified patients of both sexes are received for treatment. Careful clinical, bio-chemical, bacteriological, and pathological examinations. Private rooms with special nurses, male or female, in the Hospital or in one of the numerous villas in the grounds of the various branches can be provided.

WANTAGE HOUSE

This is a Reception Hospital in detached grounds with a separate entrance, to which patients can be admitted. It is equipped with all the apparatus for the complete investigation and treatment of Mental and Nervous Disorders by the most modern methods; insulin treatment is available for suitable cases. It contains special departments for hydrotherapy by various methods, including Turkish and Russian baths, the prolonged immersion bath, Vichy Douche, Scotch Douche, Electrical baths, Plombieres treatment, etc. There is an Operating Theatre, a Dental Surgery, an X-Ray Room, an Ultra-violet Apparatus, and a Department for Diathermy and High-frequency treatment. It also contains Laboratories for bio-chemical, bacteriological, and pathological research. Psychotherapeutic treatment is employed when indicated.

MOULTON PARK

Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupational therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

BRYN-Y-NEUADD HALL

The seaside house of St. Andrew's Hospital is beautifully situated in a Park of 330 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout-fishing in the park.

At all the branches of the Hospital there are cricket grounds, football and hockey grounds, lawn tennis courts (grass and hard courts), croquet grounds, golf courses, and bowling greens. Ladies and gentlemen have their own gardens, and facilities are provided for handicrafts, such as carpentry, etc.

For terms and further particulars apply to the Medical Superintendent (TELEPHONE: No. 2356 and 2357 Northampton), who can be seen in London by appointment.

CHEADLE ROYAL HOSPITAL, Cheadle, Cheshire.

This REGISTERED HOSPITAL, with a SEASIDE BRANCH at Colwyn Bay, N. Wales, is for the treatment and care of those of the Upper and Middle Classes suffering from MENTAL AND NERVOUS DISEASES.

The Hospital is governed by a COMMITTEE, appointed by the TRUSTEES of the Manchester Royal Infirmary.

In addition to the Main Buildings there are separate villas. Extensive grounds. Hard and grass tennis courts, cricket and croquet grounds, and a court for badminton. There are also wireless installations. Golf may be had within easy distance. Occupational Therapy.

VOLUNTARY, TEMPORARY, AND CERTIFIED PATIENTS received.

The Hospital is nine miles from Manchester, 50 minutes by rail from Liverpool, and 3½ hours from London.

For terms and further particulars apply to the Medical Superintendent, who may be seen in Manchester BY APPOINTMENT. *Telephone: Gatley* 2231 (3 lines).

CAMBERWELL HOUSE

Telegrams: "PSYCHOLIA, LONDON." 33, PECKHAM RD., LONDON, S.E.5. Telephone: Rodney 4242 (2 lines).

For the treatment of MENTAL DISORDERS.

Also completely detached Villas for Mild Cases, with private suites if desired. Voluntary Patients received. Twenty acres of Grounds. Hard and Grass Tennis Courts, Putting Greens, Bowls, Croquet, Squash Rackets, Recreation Hall with Badminton Court, and all indoor amusements, including Wireless and other Concerts, Occupational Therapy, Calisthenics, and Dancing Classes. X-ray and Actino-therapy, Prolonged Immersion Baths, Operating Theatre, Pathological Laboratory, Dental Surgery, and Ophthalmic Department. Chapel. **Shock and also modified Insulin Therapy.**

Senior Physician: Dr. HUBERT JAMES NORMAN, assisted by a resident Medical Staff, and visiting Consultants.

An Illustrated Prospectus, giving fees which are strictly moderate, may be obtained upon application to the Secretary.

The Convalescent Branch is Hove Villa, Brighton, and is 200 feet above sea level.

THE COTSWOLD SANATORIUM

First opened in 1891 and rebuilt in 1925 on the Cotswold Hills seven miles from Cheltenham, for the Treatment of Pulmonary and all other forms of Tuberculosis. Aspect S.S.W., sheltered from North and East, elevation 800 feet. Pure bracing air, SPECIAL TREATMENT by artificial PNEUMOTHORAX (X-ray controlled). TUBERCULINS, and ULTRA-VIOLET RAYS is available when necessary without extra charge. X-RAY plant, Fully Equipped Dental Department, Electric Light Radiators, hot and cold basins and Wireless in all rooms. Up-to-date drainage. Full day & night Nursing Staff. Terms: 5½ to 9½ Guineas a week inclusive.

Med. Supt.: GEOFFREY A. HOFFMAN, B.A., M.B., T.C. Dub. *Asst. Phys.:* MARGARET A. HARRISON, M.B., B.S. Lond. *Cons. Laryngologist:* G. N. BARKER, F.R.C.S. Edin., D.L.O. *Cons. Dent. Surgeon:* GEORGE V. SAUNDERS, L.D.S.R.C.S. Lond. *Phone:* 81 & 82 Witcombe. Apply: *The Secretary, The Cotswold Sanatorium, Cranham, Gloucester. Telegrams:* "Hoffman, Birdlip."

COURT HALL, KENTON, near EXETER

FOR THE TREATMENT OF EIGHT LADIES, VOLUNTARY, TEMPORARY AND CERTIFIED PATIENTS

CLIFFDEN, TEIGNMOUTH

FOR EARLY AND CONVALESCENT CASES Recreational Therapies are held daily by skilled Leaders

The house stands high with spacious balconies and extensive views of the South Devon Coast. Beautiful garden. Own Dairy in 25 acres. Private road to beach.

There is also a charming house, **EBWORTHY, MANATON, DARTMOOR,** situated in 20 acres, 1100 ft. up for bracing moorland air.

Resident Physicians—BERTHA M. MULES, M.D., B.S. ANNE S. MULES, M.R.C.S., L.R.C.P.

Telephones—STARCROSS 259 and TEIGNMOUTH 289

THE OLD MANOR SALISBURY

A Private Hospital for the Care and Treatment of those of both sexes suffering from MENTAL DISORDERS.

Extensive grounds. Detached Villas. Chapel. Garden and Dairy Produce from own farm. Terms very moderate.
CONVALESCENT HOME AT BOURNEMOUTH Detached Villas standing in 12 acres of ornamental grounds, with tennis courts, etc., which Voluntary, Temporary or Certified Patients may visit by arrangement for long or short period.
Illustrated Brochure on application to the Medical Superintendent. The Old Manor, Salisbury. Telephone: Salisbury 3216 and 3217.

MALLING PLACE, KENT

For LADIES and GENTLEMEN of Unsound Mind.
Terms moderate. Apply to Resident Medical Superintendent. Telegrams: ADAM WEST MALLING. Telephone No. 2: MALLING.

SPRINGFIELD HOUSE

Phone: BEDFORD 3417. **Near BEDFORD**
For Mental Cases with or without Certificates.
Ordinary Terms: Five Guineas per week (including Separate Bedrooms for all suitable cases without extra charge).
For forms of admission, &c., apply to the Resident Physician, CEDRIC W. BOWER.
INTERVIEWS IN LONDON BY APPOINTMENT.

THE MAGHULL HOMES FOR EPILEPTICS (Inc.)

MAGHULL (near LIVERPOOL)
FARMING and OPEN AIR OCCUPATION for PATIENTS
A few vacancies in 1st and 2nd Class Houses.
FEES: 1st Class (men only) from £3 per week upwards. 2nd Class (men and women) 32/- per week.
For further particulars apply: **C. EDGAR GRISEWOOD, A.C.A., Secretary, 20, Exchange Street East, Liverpool, 2**

NORTHUMBERLAND HOUSE

GREEN LANES,
FINSBURY PARK, N.4
A PRIVATE HOSPITAL for the treatment of mental and nervous illnesses. Conveniently situated and easy of access from all parts. Occupational Therapy, Psychotherapy, and other modern forms of treatment. A.R.P. Shelters.
Telephone: Stamford Hill 2688.
For further particulars apply to the MEDICAL SUPERINTENDENT.

FENSTANTON, at "FIVE DIAMONDS," Chalfont St. Giles, Bucks.

A Private Home for the Care and Treatment of a limited number of LADIES with Mental and Nervous Disorders. Certified, Voluntary, and Temporary Patients received. Mansion with 12 acres of ground. (*See Medical Directory*, p. 2346.) Apply Resident Physician. Telephone: Little Chalfont 2046. Station: Chalfont and Latimer.

PORTSMOUTH CITY MENTAL HOSPITAL

Accommodation is provided for the reception of PRIVATE PATIENTS of both sexes in three detached Villas, which are healthily and pleasantly situated in extensive grounds with sea views.
Charges from 3 guineas weekly, including all necessaries except clothing.—Apply to the Medical Superintendent and Resident Physician, THOMAS BEATON, O.B.E., M.D., F.R.C.P.

HEIGHAM HALL, NORWICH

PRIVATE MENTAL HOME for Nervous and Mental Illness. All forms of treatment available. Fees from 4 gns. per week upwards according to requirements. Vacancies occasionally exist at reduced fees on the recommendation of the patient's own physician.
Apply to Dr. J. A. SMALL. Telephone: Norwich 60

THE GROVE HOUSE,

CHURCH STRETTON, SHROPSHIRE.
Private Home for Ladies mentally ill. Voluntary and Temporary Patients received.
Medical Superintendent: Dr. J. A. MCCLINTOCK.

St. Mark's Hospital for Cancer,

FISTULA AND OTHER DISEASES OF THE RECTUM, City-road, London, E.C.1.

Applications are invited from Male registered medical practitioners, including R practitioners who now hold A posts, for the appointment of a HOUSE SURGEON (B2) for three months from 1st September, 1941. Salary at the rate of £200 per annum.
Applications, with copies of testimonials, to be sent to the SECRETARY, from whom further particulars may be obtained.

Examining Surgeons:

FACTORIES ACT, 1937.

The following appointments as Examining Surgeon under the Factories Act, 1937, are vacant. Applications should be sent to the CHIEF INSPECTOR OF FACTORIES, 28 Broadway, S.W.1.

District	*County*	*Latest date for receipt of application*
MAIDEN NEWTON..	DORSET ..	2nd September, 1941
ALYTH	PERTH ..	2nd September, 1941

Hospital for Consumption and Diseases

OF THE CHEST, Brompton, S.W.3.

Applications are invited for the following appointments from registered medical practitioners, Male and Female, including R practitioners who now hold A posts:—
HOUSE PHYSICIANS (B2), for which there are two vacancies. The duties include work in the Out-patient Department as well as in the wards, and the appointment is for six months, commencing on 1st November, with an honorarium of £50.
HOUSE PHYSICIAN (B2) at the Sanatorium at Frimley. The appointment is for six months, commencing on 1st November, with an honorarium of £50.
Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of one or more recent testimonials, should reach the undersigned not later than Saturday, 6th September, 1941.
Brompton, August, 1941. F. G. ROUVRAY, Secretary.

Resident Junior Assistant Medical

OFFICER (B2) required by MIDDLESEX COUNTY COUNCIL for NORTH MIDDLESEX COUNTY HOSPITAL, Edmonton N.18. Applications are invited from registered medical practitioners, Men or Women, who have held resident appointments in general hospitals, and also for R practitioners who now hold A posts. Salary £250 per annum, board, lodging, and laundry. Whole-time duties, chiefly in out-patient department, such as the Council may direct on the supervision of the Medical Superintendent. Appointment, subject to medical examination and one month's notice, is for six months with possibility of extension to twelve months (except in the case of R practitioners). Post vacant 16th September, 1941.
Applications, stating age, qualifications with dates, nationality, present post, and previous appointments, to the undersigned. No application forms provided. Relationship to any member or officer of the Council to be disclosed. Copies of not more than three recent testimonials. Canvassing, directly or indirectly, will disqualify. Closing date 8th September, 1941.
C. W. RADCLIFFE, "B3," Clerk to the County Council.
Guildhall, Westminster, S.W.1.

Resident House Officer (A) required by

MIDDLESEX COUNTY COUNCIL for CLARE HALL COUNTY SANATORIUM AND HOSPITAL, SOUTH MIMMS, MIDDLESEX. Applicants must be registered medical practitioners, including R practitioners within three months of qualification. Salary £120 per annum, board, lodging, and laundry. Appointment is for six months, subject to medical examination and one month's notice. Whole-time duties, chiefly medical, such as Council may direct, under supervision of Medical Superintendent. Post now vacant.
Applications, stating age, qualifications with dates, nationality, and particulars of previous experience, to the undersigned. No application forms provided. Relationship to any member or officer of the Council to be disclosed. Copies of not more than three recent testimonials. Canvassing, directly or indirectly, will disqualify. Closing date 30th August, 1941.
C. W. RADCLIFFE, "B3," Clerk of the County Council.
Guildhall, Westminster, S.W.1.

Visiting Specialist in Venereal Diseases

required by MIDDLESEX COUNTY COUNCIL. Applications invited for the post of Visiting Specialist in Venereal Diseases to be in charge of clinics about to be established at HILLINGDON COUNTY HOSPITAL, UXBRIDGE, MIDDLESEX, and WEST MIDDLESEX COUNTY HOSPITAL, ISLEWORTH, MIDDLESEX. Candidates should be medical practitioners of high professional attainments, who have devoted themselves wholly or chiefly to the study and practice of this specialty. Two sessions weekly at each hospital; remuneration £3 3s. for a session of approximately two and a half hours.
Applications, stating age, nationality, qualifications, and experience, to the undersigned. No application forms provided. Relationship to any member or officer of the Council to be disclosed. Copies of not more than three recent testimonials. Canvassing, directly or indirectly, will disqualify. Closing date 30th August, 1941.
C. W. RADCLIFFE, "B3," Clerk of the County Council.
Guildhall, Westminster, S.W.1.

HIS MAJESTY'S COLONIAL SERVICE

THE COLONIAL MEDICAL SERVICE

VACANCIES FOR MEDICAL OFFICERS

The maintenance of an efficient Colonial Medical Service constitutes a vital part of the national war effort and it is most important that the Service should be assured of an adequate supply of doctors.

The Secretary of State for the Colonies therefore invites applications from doctors possessing a medical qualification registrable in the United Kingdom who are British subjects and who are under thirty-five years of age.

Medical Officers are appointed in the first instance for general service. But there are ample opportunities for work in special branches of medicine and surgery, in public health and in medical research.

The normal salary scale is from £600 to between £1,000 and £1,120. There are large numbers of super-scale posts to which promotion is made on merit and which carry higher salaries.

Government quarters, in many cases free of rent, and first-class passages to and from the Colonies are provided, and an adequate pension scheme is in force.

Selected candidates are normally required to attend a course of instruction in Tropical Medicine and Hygiene either before proceeding overseas or during their first period of leave.

Further particulars, including the regulations governing admission to the Colonial Medical Service, may be obtained from the Director of Recruitment (Colonial Service), 29, Queen Anne's-gate, London, S.W.1.

Miller General Hospital,

Greenwich High-road, S.E.10.

Applications are invited from registered medical practitioners, Male, for the appointment of CASUALTY OFFICER (part-time—morning session), to become vacant on 1st October, 1941. Salary is at the rate of £125 per annum (resident), £150 (non-resident), plus share of Ministry of Health allowance. Fuller particulars on application.

Form of application can be obtained from the undersigned and must be returned not later than 13th September, 1941.

18th August, 1941. ERNEST E. MARKS, Secretary.

Miller General Hospital,

Greenwich High-road, S.E.10.

Applications are invited from registered medical practitioners, Male, for the appointment of HOUSE SURGEON (A), to become vacant on 1st October, 1941, including R practitioners within three months of qualification. If held by an R practitioner, appointment will be for a period of six months. Salary is at the rate of £100 per annum, plus share of Ministry of Health allowance, and full residential emoluments.

Form of application can be obtained from the undersigned, and must be returned not later than 13th September, 1941.

18th August, 1941. ERNEST E. MARKS, Secretary.

West London Hospital,

Hammersmith, W.6.

Appointment of RESIDENT ANÆSTHETIST AND E.N.T. AND OPHTHALMIC HOUSE SURGEON (B2). Applications are invited from registered medical practitioners for the above appointment, to become vacant on 25th September, including R practitioners who now hold A posts, when appointment will be limited to six months.

The appointment is for a period of six months in the first instance, terminable by one month's notice on either side. Salary according to experience, but not less than £100 per annum, with the usual residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, should be accompanied by copies of three recent testimonials and sent to the undersigned not later than 13th September. H. A. MADGE, Secretary.

London County Council.

Medical practitioners required for under-mentioned positions with general medical or surgical duties in Council's general and special hospitals. Married quarters not available.

TEMPORARY ASSISTANT MEDICAL OFFICERS (Class I), B1.—Salary £350–£25–£425. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply.

TEMPORARY ASSISTANT MEDICAL OFFICERS (Class II), B2.—Salary £250. R practitioners who hold A posts may apply. If held by R practitioners the appointments will be limited to six months.

All positions are with board, lodging, and washing.

Application forms obtainable (stamped addressed foolscap envelope necessary) from MEDICAL OFFICER OF HEALTH, S.D.2, County Hall, S.E.1, returnable by 8th September. Canvassing disqualifies.

Central London Throat, Nose and Ear

HOSPITAL, Gray's Inn-road, London, W.C.1.

HOUSE SURGEON (B2) (MALE OR FEMALE).

Applications are invited from registered medical practitioners, including R practitioners who now hold A posts, for the post of House Surgeon which will shortly be vacant. If held by an R practitioner the appointment is limited to six months, three as Second and three as First. Otherwise it will be for a period of nine months. Salary at the rate of £75 per annum.

Applications, stating age, qualifications, nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned immediately.

JOHN H. YOUNG, Secretary-Superintendent.

King Edward Memorial Hospital,

Mattock-lane, Ealing, W.13.

Applications are invited from registered medical practitioners, Male or Female, for the appointment of CASUALTY OFFICER AND DEPUTY RESIDENT MEDICAL OFFICER (B2), vacant 1st September, 1941, including R practitioners who now hold A posts. Six months' appointment. Salary at the rate of £225 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of two recent testimonials, should be sent to the undersigned immediately.

R. A. MICKELWRIGHT, House Governor.

Poplar Hospital, E.14.

APPOINTMENT OF RESIDENT SURGICAL OFFICER (B1).

Applications are invited from registered medical practitioners for the appointment of Resident Surgical Officer, to become vacant on 30th August, 1941. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply. Salary is at the rate of £350.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by copies of three recent testimonials, should be sent to the undersigned as soon as possible.

D. H. LINDSAY, House Governor and Secretary.

12th August, 1941.

Appointment of Two Medical

REGISTRARS (B1).—Applications are invited from registered medical practitioners for the appointment of Two Medical Registrars (B1), to become vacant on 1st October, 1941, at ST. THOMAS'S HOSPITAL. Applicants should have held house appointments. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply. Salary is at the rate of £250 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, should be sent to the undersigned at St. Thomas's Hospital, London, S.E.1, not later than 1st September, 1941. ROBERT BORLEY, Secretary.

Borough of Ilford.

APPOINTMENT OF RESIDENT MEDICAL OFFICER AT MATERNITY HOME.

Applications are invited for the above whole-time appointment from registered Women medical practitioners at a commencing salary of £400 per annum, rising by annual increments of £25 to £500 per annum, with board, lodging, and laundry.

The appointment will be subject to the provisions of the Local Government Superannuation Acts and to formal agreement, and the selected applicant will be required to pass a medical examination to the satisfaction of the Medical Officer of Health. The appointment will also be subject to three months' notice on either side.

Applications, endorsed "Resident Medical Officer" and accompanied by copies of three recent testimonials, to be made on a form obtainable from my office, must be received at my office at the Town Hall, Ilford, not later than Monday, the 8th September, 1941.

Canvassing, directly or indirectly, will be a disqualification.

CHARLES N. ROBERTS, Town Clerk.

Town Hall, Ilford, 18th August, 1941.

The Royal Portsmouth Hospital,

PORTSMOUTH.

Applications are invited from registered medical practitioners for the post of HOUSE SURGEON (A), vacant 14th September, 1941, including R practitioners within three months of qualification. Appointment will be for six months. Salary at the rate of £120 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of testimonials, should be sent to the undersigned as soon as possible.

B. WAGSTAFF, Secretary.

Surrey County Council.

PUBLIC HEALTH DEPARTMENT.

CUMBERLAND HOUSE HOSPITAL, MITCHAM.
(110 Beds.)

Applications are invited for the position of RESIDENT MEDICAL OFFICER (B1) at the above Auxiliary Hospital, which will act as an annexe to the St. Helier County Hospital. The person appointed will be under the direction of the Medical Superintendent of the St. Helier County Hospital. Suitably qualified R practitioners holding B1 or B2 appointments may apply.

Salary will be at the rate of £350 per annum, rising by annual increments of £25 to a maximum of £450 per annum, plus full residential emoluments valued at £125 per annum. Applicants must have held previous resident hospital appointments and should preferably possess a higher qualification. The appointment will be for the duration of the war in the first instance and the post is subject to the Local Government Superannuation Act, 1937.

Applications, giving age, qualifications, and experience, and enclosing copies of three testimonials, should be sent to the County Medical Officer, County Hall, Kingston-on-Thames, so as to be received as soon as possible.

DUDLEY AUKLAND, Clerk of the Council.

County Hall, Kingston-on-Thames, 15th August, 1941.

Borough of Blyth.

TEMPORARY APPOINTMENT OF ASSISTANT MEDICAL OFFICER OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICER (MALE OR FEMALE).

The Council invite applications from registered medical practitioners (Male or Female) for the temporary appointment of Assistant Medical Officer of Health and Assistant School Medical Officer.

The duties will consist largely of school medical and child welfare work, but the officer appointed will be required to assist generally in the work of the Health Department under the direction of the Medical Officer of Health.

The salary will be at the rate of £500 per annum, rising by annual increments of £25 to £700 per annum, and preference will be given to candidates with previous public health experience.

The appointment will be for six months and is not subject to the provisions of the Local Government Superannuation Act 1937.

The person appointed will be required to reside within the Borough.

Forms of application will not be issued, but candidates are required to forward applications, including age, qualifications, and experience, to the Medical Officer of Health, Health Department, Wellington House, Blyth, Northumberland, not later than Saturday, the 30th August, 1941.

J. LEIGH TURNER, Town Clerk.

"Dinsdale," Marine-terrace, Blyth, 9th August, 1941.

County Borough of Blackburn.

PUBLIC ASSISTANCE DEPARTMENT.

RESIDENT JUNIOR ASSISTANT MEDICAL OFFICERS (A).

Applications are invited from registered medical practitioners (Male or Female) for appointments of Two Resident Junior Assistant Medical Officers at QUEEN'S PARK HOSPITAL AND INSTITUTION, including R practitioners within three months of qualification.

The staff consists of a Resident Medical Officer, two Resident Junior Assistant Medical Officers (the appointments above-mentioned), Consulting Surgeon, Laboratory Assistant, and X-ray Attendant.

There is a separate hospital, separate mental block, and a separate hospital for children, and there is opportunity for experience in all departments, including medical, surgical, and midwifery cases. An X-ray apparatus is installed.

The persons appointed will be required to devote the whole of their time to the duties and to act as may be directed by the Resident Medical Officer. The appointments will be limited to a term not exceeding one year. If held by R practitioners, appointments will be for a period of six months.

Salary at the rate of £200 per annum, together with board, apartments, and attendance.

Applications, stating age, qualifications, and experience, and accompanied by copies of not more than three recent testimonials, must be sent to the Public Assistance Officer, Cardwell-place, Blackburn.

CHAS. S. ROBINSON, Town Clerk.

Town Hall, Blackburn, 7th August, 1941.

Summersdale Hospital, Graylingwell,
CHICHESTER.

APPOINTMENT OF A HOUSE SURGEON (A).

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a House Surgeon (A) to become vacant immediately including R practitioners within three months of qualification. If held by an R practitioner, appointment will be for a period of six months. Otherwise it will be for a period of six months in the first instance. Salary is at the rate of £120 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates and nationality, and accompanied by copies of three recent testimonials, should be sent to the Medical Superintendent as soon as possible.

AMENDED ADVERTISEMENT.

County Borough of South Shields.

APPOINTMENT OF DEPUTY MEDICAL OFFICER OF HEALTH.

Applications are invited from registered medical practitioners for the above-mentioned appointment.

Applicants should be not more than forty-five years of age and must possess the Diploma in Public Health. Experience in Air-raid Precautions would be considered an advantage.

The salary will be at the rate of £750 per annum, rising by annual increments of £25 to £850 per annum, together with £50 per annum car allowance.

Forms of application may be obtained from the undersigned, and should be returned, together with copies of three testimonials, not later than 10 A.M. on Monday, the 1st September, 1941, in an envelope endorsed "Deputy Medical Officer of Health."

Canvassing in any form will disqualify.

HAROLD AYREY, Town Clerk.

Town Hall, South Shields, 12th August, 1941.

Northumberland County Council.

HEXHAM HOSPITAL. (400 Beds.)

APPOINTMENT OF HOUSE SURGEON (A).

Applications are invited from registered medical practitioners for the above appointment, including R practitioners within three months of qualification. The appointment will be tenable for a period of six months. Salary £120 per annum, together with the usual residential emoluments.

Applications, stating age, qualifications with dates, and nationality, accompanied by copies of two recent testimonials, should be forwarded to the undersigned immediately.

JOHN WALKER, County Medical Officer.

New Senior School, Mitford-road, Morpeth, Northumberland.

The Southampton Children's Hospital
AND DISPENSARY FOR WOMEN.

APPOINTMENT OF A RESIDENT MEDICAL OFFICER (A).

Applications are invited from registered medical practitioners, Female, for the appointment of a Resident Medical Officer (A), to become vacant on the 12th September.

Salary is at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned not later than the 1st September. ELLA K. MATTHEWS, Secretary.

Royal Albert Edward Infirmary and
DISPENSARY, WIGAN. (Normally 189 Beds.)

APPOINTMENT OF RESIDENT SURGICAL OFFICER (B1).

Applications are invited from registered medical practitioners (Male) for the appointment of Resident Surgical Officer to become vacant on 1st October, 1941. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply. Salary is at the rate of £250 per annum.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by copies of three recent testimonials, should be sent to the undersigned as soon as possible.

A. STANLEY BRUNT, General Superintendent and Secretary.

14th August, 1941.

Liverpool Hospital for Consumption
AND DISEASES OF THE CHEST,
68, Mount Pleasant, LIVERPOOL, 3.

Applications are invited for the position of Part-time MEDICAL OFFICER for the OUT-PATIENTS' DEPARTMENT, to be in attendance each day, Monday to Friday inclusive, from 12.30 P.M. to 2.30 P.M. approximately. Salary £120 per annum, with lunch provided.

Applications, with copies of three recent testimonials or names of two referees, to be sent to the SECRETARY.

Mansfield and District General
HOSPITAL. (190 Beds.)

The Board of Management will shortly consider the appointment of an additional SURGEON to the staff. The post in the first instance will be for the duration of the war. Applicants must possess F.R.C.S. qualification and be in consulting surgical practice.

Further particulars regarding attendance, duties, rate of remuneration, &c., may be obtained on application to the undersigned.

A. ASHWORTH, House Governor and Secretary.

Royal Surrey County Hospital,
GUILDFORD. (475 Beds.)

Applications are invited from registered medical practitioners, Male, including R practitioners within three months of qualification, for the appointment of HOUSE PHYSICIAN (A), vacant on 1st October, 1941. The appointment is for six months and is recognised as a qualification for the M.D. examination. Salary £150 per annum, with full residential emoluments.

Applications, stating age, qualifications, with copies of not more than three testimonials, to reach the SECRETARY-SUPERINTENDENT by 6th September, 1941.

Manchester Royal Infirmary.

APPOINTMENT OF BLOOD TRANSFUSION OFFICER (B2 POST).

The Board of Management of the Manchester Royal Infirmary invite applications from registered medical practitioners, including R practitioners who now hold A posts, for the appointment of Resident Blood Transfusion Officer (B2 post) now vacant. Applicants to be registered and have held a hospital appointment; if held by an R practitioner the appointment will be limited to six months.

The duties include examination of blood donors, grouping of patients, collection and storage of blood, and maintenance of the Blood Bank at the Infirmary. The officer will be expected to carry out research on problems connected with blood transfusion and to work in conjunction with the Civilian Hospital Emergency Blood Transfusion Service for the area as may be required.

The appointment is full time; salary £150 per annum, with board, residence, and allowance for laundry.

Applications, stating age and qualifications, nationality, and present post, accompanied by copies of testimonials, should be sent to the Chairman of the Medical Board immediately.

By Order,
F. J. CABLE, General Superintendent and Secretary.

13th August, 1941.

Oxfordshire County Council.

WARWICK ROAD HOSPITAL AND PUBLIC ASSISTANCE INSTITUTION, BANBURY.

APPOINTMENT OF RESIDENT MEDICAL OFFICER (B2).

Applications are invited from registered medical practitioners (Male and Female) for the post of Resident Medical Officer (B2). R practitioners holding A posts may apply, when appointment will be limited to six months.

The M.S. part of the Institution is a fully equipped surgical unit and the officer appointed will also have the care of the patients on the Public Assistance side of the Institution.

The salary is at the rate of £300 per annum, with full residential emoluments, and will be terminable by three months' notice on either side.

Applications, stating age, qualifications with dates, nationality, previous experience, and present post, and accompanied by copies of three recent testimonials, should be sent to the undersigned not later than 30th August, 1941.

F. G. SCOTT, Clerk of the Council.

County Hall, Oxford, 16th August, 1941.

City of Sheffield.

LODGE MOOR HOSPITAL. (508 Beds.)
(INFECTIOUS DISEASES.)

APPOINTMENT OF TEMPORARY RESIDENT MEDICAL OFFICER (B2).

Applications are invited from registered medical practitioners for the post of Temporary Resident Medical Officer, including R practitioners within three months of qualification. If held by an R practitioner, appointment will be for a period of six months, otherwise it will be for a period of twelve months. The appointment will be terminable at any time by one month's notice on either side. Salary £300 per annum, with full residential emoluments.

Applications, stating age, qualifications, and when at liberty, together with copies of recent testimonials, should be sent immediately to the MEDICAL SUPERINTENDENT, Lodge Moor Hospital, Sheffield, 10.

Aberdeen Royal Infirmary.

Applications are invited from registered medical practitioners, Male or Female, including R practitioners who now hold A posts, for the appointment of RESIDENT ANÆSTHETIST (B2). If the person appointed is an R practitioner the appointment will be for a period of six months. Otherwise it will be for a period of twelve months. Salary is at the rate of £200 per annum, with living-out allowance if quarters not available.

Applications, stating age, nationality, qualifications with dates, and present post, and accompanied by six copies of three recent testimonials, should be sent to the undersigned, from whom particulars of the duties may be obtained, not later than 6th September, 1941.

R practitioners must have obtained the sanction of the Scottish Central Medical War Committee to their application.

JOHN A. MCCONACHIE, Clerk and Treasurer.

1, Albyn-place, Aberdeen, 16th August, 1941.

Ministry of Pensions Hospitals.

Applications are invited from registered medical practitioners, Male or Female, for appointments as HOUSE SURGEONS (B2 and A). R practitioners holding A posts may apply for the B2 appointments, which will be limited to six months, or those within three months of qualification for the A appointments, which will be for a period of six months.

Salaries: B2 appointments, £200–£300 per annum; A appointments, £120–£190 per annum—according to experience. Free board and lodging, or £100 per annum in lieu, will be provided.

Applications, stating age, qualifications (with dates) and nationality, accompanied by copies of three recent testimonials, should be addressed to the SECRETARY, Establishment Division, Ministry of Pensions, Norcross, Blackpool, Lancs.

City of Manchester.

MONSALL HOSPITAL FOR INFECTIOUS DISEASES. (600 Beds.)

APPOINTMENT OF JUNIOR RESIDENT ASSISTANT MEDICAL OFFICER (A).

Applications are invited from registered medical Men for the above appointment which will become vacant on 1st October, 1941, including R practitioners within three months of qualification. The appointment will be for a period of six months, renewable for a further six months. If held by an R practitioner the appointment will be for a period of six months.

Preference will be given to candidates who have held resident surgical and medical posts in a general hospital and have taken the Diploma in Public Health or had special experience in bacteriology.

The basic salary for the appointment is at the rate of £250 per annum or, if held by an R practitioner as above, £125 per annum, together with full residential emoluments subject to the Manchester Corporation conditions of service. A temporary cost-of-living wages award is payable in addition to the foregoing salaries.

Full information and forms of application may be obtained from the Medical Officer of Health, Hospitals Administration Section, P.O. Box No. 399, Town Hall, Manchester, 2, and applications for the post must be received by him not later than 2nd September, 1941.

Canvassing in any form is prohibited.

R. H. ADCOCK, Town Clerk.

Town Hall, Manchester, 2, 18th August, 1941.

North Staffordshire Royal Infirmary, STOKE-ON-TRENT.

Applications are invited from registered medical practitioners (Male and Female), including R practitioners (i) who now hold A post, or (ii) are within three months of qualification, for the following appointments, vacant 1st October:—

(i) RESIDENT ANÆSTHETIST (B2), £200 per annum.
ORTHOPÆDIC HOUSE SURGEON (B2), £200 per annum.

(ii) Two HOUSE SURGEONS (A), £150 per annum.
One HOUSE SURGEON to EYE, E.N.T. DEPARTMENTS (A), £150 per annum.

Previous experience is desirable for the post of Orthopædic House Surgeon, which offers exceptional experience. The posts are tenable for six months and include full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of three recent testimonials, should be sent to the undersigned as soon as possible.

THORNBURROW GIBSON, Secretary and House Governor.

City of Birmingham.

DUDLEY ROAD HOSPITAL. (926 Beds.)

APPOINTMENT OF PHYSICIAN (B1).

Applications are invited from registered medical practitioners for the appointment of Physician (non-resident), to become vacant on 1st October, 1941. Applicants should hold the diploma of F.R.C.P., and preference will be given to those who in addition hold the degree of Doctor of Medicine of one of the Universities of the United Kingdom. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply.

Salary will be £700, rising by annual increments of £50 to £1000 per annum, together with a cash allowance of £250 per annum in lieu of emoluments.

The appointment will be dependent on the candidate passing a medical examination, and be subject to the Local Government Superannuation Act, 1937, and the Birmingham Municipal Officers' Widows' and Orphans' Pension Scheme (if applicable).

The appointment will be terminable by one month's notice on either side.

Further particulars of the appointment may be obtained from the Medical Superintendent of the Hospital.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by copies of three recent testimonials, should be sent to the MEDICAL OFFICER OF HEALTH, Council House, Birmingham, 3, not later than the 5th September, 1941.

St. Ann's Hospital, Nottingham.

Applications are invited from medical practitioners, Male or Female, for the post of RESIDENT MEDICAL OFFICER at the Ministry of Health Hospital, Thorneywood, Nottingham. The appointment is an A post as defined by the Central Medical War Committee and is open to R practitioners now holding A posts. If held by an R practitioner the appointment will be limited to six months. The salary will be at the rate of £200 per annum, with in addition £100 per annum in lieu of residential emoluments. The engagement will be subject to one month's notice and to the conditions from time to time applying to medical officers under the Ministry's Hospital Scheme.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied only by a list of three names of responsible persons to whom reference may be made, should be sent as soon as possible to the MEDICAL SUPERINTENDENT, Mapperley Hospital, Nottingham.

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West Riding of Yorkshire Hospitals BOARD.

PINDER FIELDS HOSPITAL, WAKEFIELD.

APPOINTMENT OF HOUSE SURGEON (A OR B2).

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a House Surgeon (A or B2), for a post at present vacant, including R practitioners within three months of qualification when applying for A post or R practitioners who now hold A posts when applying for B2 post. If held by an R practitioner the appointment will be for a period of six months, otherwise the appointment, subject to satisfactory service, will be terminable by one month's notice on either side. Salary is at the rate of £120 per annum, with full residential emoluments, for A post, and at the rate of £200 per annum, with full residential emoluments, for B2 post.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned not later than 30th August, 1941. G. L. BANNER, Clerk of the Board.

Board Offices, Victoria Chambers, Wood-street, Wakefield (P.O. Box No. 28), August, 1941.

West Riding of Yorkshire Hospitals BOARD.

PINDER FIELDS HOSPITAL, WAKEFIELD.

APPOINTMENT OF FOUR HOUSE SURGEONS FOR ORTHOPÆDIC UNIT (A OR B2).

Applications are invited from registered medical practitioners, Male and Female, for the appointment of Four House Surgeons (A or B2) for the Orthopædic Unit, for posts at present vacant, including R practitioners within three months of qualification when applying for A posts or R practitioners who now hold A posts when applying for B2 posts. If held by an R practitioner the appointment will be for a period of six months, otherwise the appointment, subject to satisfactory service, will be terminable by one month's notice on either side. Salary is at the rate of £120 per annum, with full residential emoluments, for A posts, and at the rate of £200 per annum, with full residential emoluments, for B2 posts.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned not later than 30th August, 1941. G. L. BANNER, Clerk of the Board.

Board Offices, Victoria Chambers, Wood-street, Wakefield (P.O. Box No. 28), August, 1941.

County Borough of St. Helens.

ASSISTANT MEDICAL OFFICER FOR A.R.P.

Applications are invited for the appointment of Assistant Medical Officer of Health (Male) for Air-Raid Precautions duties in St. Helens. The officer appointed will be responsible under the Medical Officer of Health for the general organisation and administration of the Casualties Services of the Borough. Experience in similar work is desirable but not essential. The Medical Officer appointed may also occasionally be required to carry out other public health duties as the Medical Officer of Health may direct.

The appointment is at present temporary and would be subject to one month's notice on either side, and is subject to the provisions of the Local Government Superannuation Act, 1937.

The salary will be at the rate of £600 per annum, plus a motor-car allowance at the rate of £50 per annum. The salary is at present subject to a temporary war cost-of-living bonus at the rate of 6 per cent. on the first £300 and 3 per cent. on the next £200 or part.

Forms of application may be obtained from the undersigned, to whom they should be returned, accompanied by copies of three recent testimonials, not later than 6th September, 1941.

FRANK HAUXWELL, Medical Officer of Health.

Town Hall, St. Helens, 18th August, 1941.

Runwell Hospital for Mental and NERVOUS DISORDERS,

Near WICKFORD, ESSEX. (1010 Beds.)

Temporary ASSISTANT MEDICAL OFFICER required (Man or Woman) (B1). Salary £350, rising by £25 to £450 per annum, plus £50 for D.P.M., all found. Part of the Institution is used as a general hospital. Suitably qualified R practitioners holding B1 or B2 appointments are invited to apply.

Applications, stating age, experience, &c., together with copies of recent testimonials, to be forwarded to the PHYSICIAN-SUPERINTENDENT as soon as possible. Previous knowledge of psychiatry not essential.

Jenny Lind Hospital for Children, NORWICH.

Applications are invited for the post of RESIDENT MEDICAL OFFICER. Salary £120, with board, residence, and laundry. Candidates (Female), who must possess registered qualifications, should forward applications, stating age, experience &c., together with copies of testimonials, to the undersigned not later than first post on Tuesday, 2nd September.

FRANK INCH, Secretary.

22nd August, 1941.

Royal Cornwall Infirmary, Truro.

(285 Beds.)

ORTHOPÆDIC DEPARTMENT AND FRACTURE DEPARTMENT (A).

APPOINTMENT OF RESIDENT SURGICAL OFFICER (B1).

Applications are invited from registered medical practitioners holding B2 or B1 appointments for the above post. Previous orthopædic and fracture experience is essential. The post is now vacant. Salary £350 per annum, with board, lodging, and laundry.

Applications, stating age, qualifications, and experience, nationality, and present post, accompanied by copies of three recent testimonials, to be sent to the undersigned.

W. E. GRENFELL, Hon. Secretary.

Truro, 16th August, 1941.

The Jessop Hospital for Women, SHEFFIELD.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (B2) now vacant, including R practitioners who now hold A posts. If held by an R practitioner the appointment will be limited to six months. The salary is at the rate of £100 per annum, with full residential emoluments. Membership of a Medical Defence Society is a condition of appointment.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of three recent testimonials, should be sent to the undersigned immediately.

DAVID OSWALD, Superintendent and Secretary.

Royal Isle of Wight County Hospital, RYDE.

APPOINTMENT OF A HOUSE SURGEON (B2).

Applications are invited from registered medical practitioners, Female, for the appointment of a House Surgeon (B2) to become vacant on 1st October next. The appointment will be for six months. Salary at the rate of £180 a year, with board, residence, and laundry. As this is the senior post, previous surgical experience is advisable.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned without delay.

A. S. GORDON, Secretary.

Royal Lancaster Infirmary, Lancaster.

Second-hand SURGICAL INSTRUMENTS are required, suitable for air-raid casualty work. Offers, giving an exact specification of the instruments and the price required, should be addressed to the undersigned.

FRANK A. MILNES, Superintendent-Secretary.

13th August, 1941.

Laboratory Technician required

(British) for work in Medical Department of Midland factory. Experience in Blood Counting essential. Salary £4 per week.—Address, No. 806, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Wanted, a Home for a few weeks

or months, for a young woman with asthma, in a doctor's house, or in that of an experienced nurse, in a reasonably safe area, preferably in the West.—Address, No. 807, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

For Sale, Second-hand X-ray Apparatus

purchased in 1933, 30/90 non-shockproof Screening Stand and Couch fitted with 6 k.w. bifocal metalix self-rectifying tube.—Address, No. 808, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

General Practitioner desires Part-time

Hospital Appointment. Experienced in skin diseases.—Address, No. 804, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

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